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IN THE

Supreme Court of the United States

OCTOBER TERM, 1983

STRUTHERS PATENT CORPORATION,
STRUTHERS WELLS CORPORATION and
STRUTHERS SCIENTIFIC & INTERNATIONAL CORPORATION,

Petitioners,

–against–

THE NESTLE COMPANY, INC.,

Respondent.

PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE THIRD CIRCUIT

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QUESTIONS PRESENTED

1. Where the District Court has granted an unprecedented summary judgment of invalidity with respect to ten United States patents by adopting the arguments of counsel for the moving party with respect to the meaning of the patents and prior art and rejecting the sharply divergent views thereof given by a patentee and expert in uncontroverted opposing affidavits, and the Court of Appeals has affirmed without opinion, have the limits of established summary judgment procedure been so seriously exceeded as to call for the exercise by this Court of its supervisory power under Rule 17.1(a) of the Supreme Court Rules to forbid such encroachments on the right of trial by jury?

2. May a court, on motions for summary judgment of invalidity of ten patents, after deciding that no expert testimony was required to understand the technology involved, choose to disbelieve and disregard the uncontroverted sworn statements of a patentee and expert and make its own contrary determinations with respect to the nature and scope of the patents, the prior art and the level of skill in the art, and hold the patents invalid as being directed to obvious and unpatentable subject matter?

3. May a court, on a motion for summary judgment, dispense with inquiring into the evidentiary facts relating to the level of ordinary skill in the art on the grounds that the descriptions of the processes and apparatus in ten patents were readily understandable to it and employed concepts with which it was familiar?

4. (a) May a sale of apparatus for performing freeze concentration properly be held under 35 U.S.C. § 102(b) to invalidate a process patent claiming a unitary process for freeze concentration combined with freeze drying?

(b) May a sale of apparatus for performing freeze concentration properly be held under 35 U.S.C. § 102(b) to invalidate

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a patent claiming a system of apparatus for freeze concentration combined with freeze drying?

STATEMENT PURSUANT TO SUPREME COURT RULES 28 AND 28.1

The parties to the proceedings are those listed in the caption.

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–against–

THE NESTLE COMPANY, INC.,
Respondent.

PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE THIRD CIRCUIT

OPINIONS BELOW

The opinion of the District Court for the District of New Jersey is reported in 558 F.Supp. 747. It is also reproduced in the Appendix at A31 through A508.* The Judgment Order of the Court of Appeals has not yet been reported. It appears at A1.

JURISDICTION

The judgment of the Court of Appeals was entered on March 28, 1983. A timely petition for rehearing in banc (A509) was filed by Petitioners on April 11, 1983 and denied by the Court

* Appendix to this Petition for a Writ of Certiorari so indicated herein.

in an order entered on April 25, 1983 (A3). The jurisdiction of this Court is invoked pursuant to 28 U.S.C. § 1254(1).

CONSTITUTIONAL PROVISIONS AND STATUTES INVOLVED

(a) The federal statutory provisions involved, in pertinent part, are:

Title 35, United States Code

§ 102. Conditions for patentability; novelty and loss of right to patent

A person shall be entitled to a patent unless—

* * *

(b) the invention was patented or described in a printed publication in this or a foreign country, more than one year prior to the date of the application for patent in the United States, or

* * *

§ 103. Conditions for patentability; nonobvious subject matter

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

(b) Rule 56(c) of the Federal Rules of Civil Procedure, which provides:

(c) Motion and Proceedings Thereon.

> The motion shall be served at last 10 days before the time fixed for the hearing. The adverse party prior to the day of hearing may serve opposing affidavits. The judgment sought shall be rendered forthwith if the pleadings, depositions, answers to interrogatories, and admissions on file, together with the affidavits, if any, show that there is no genuine issue as to any material fact and that the moving party is entitled to a judgment as a matter of law. A summary judgment, interlocutory in character, may be rendered on the issue of liability alone although there is a genuine issue as to the amount of damages.

STATEMENT OF THE CASE

This is a suit for patent infringement in which Petitioners, Struthers Patent Corporation, Struthers Wells Corporation and Struthers Scientific & International Corporation ("Struthers"), have charged Respondent, The Nestle Company, Inc. ("Nestle"), with infringement of ten United States patents relating to processes and apparatus for freeze concentration useful in the manufacture of instant coffee.*

The District Court, in an unprecedented and startling decision, held all ten patents invalid on motions by Respondent for summary judgment.** What makes the decision so unusual, and calls for this Court to exercise its supervisory power under Rule 17.1(a) of the Supreme Court Rules, is not the number of patents involved, but the number of *facts* which the District Court found were not in issue despite affidavits of Petitioners' expert to the contrary.

The patents contain forty-nine claims (each an individual invention); the claims were invalidated on at least three separate grounds, obviousness (35 U.S.C. § 103), prior sale or offer for

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* The patents in suit are reproduced in the appendix at A 684-723.

** The patents were grouped into four groups and a separate motion was brought for each group.

sale (U.S.C. § 102(b)), and insufficiency of disclosure (35 U.S.C. § 112). In most cases, multiple grounds for invalidity were cited. The issues relating to prior sale turned on a determination of such questions as whether the inventions were completed at the time of the alleged sales and whether apparatus sold for freeze concentration was *intended* to be combined with apparatus for freeze drying, which was not sold. The issues of obviousness were determined by the District Court without the aid of expert testimony and in direct contradiction to the sworn statements of Petitioners' expert in opposition to the motions.

And all of these factual determinations were made by the District Court without the aid of any testimony or discovery *in this case* on the part of the moving party, Nestle. All of the documentary evidence was taken from other, earlier cases between Struthers and General Foods Corporation ("General Foods").* Nestle offered no affidavits other than those of its counsel and the District Court chose to accept the arguments of Nestle's counsel and reject the opposing sworn statements of Struthers' expert and patentee, Neophytos Ganiaris.

Furthermore, the District Court judged Ganiaris' credibility on the basis of a reading of the bare affidavits *and found him to have sworn falsely* (A399). Ganiaris was not given the opportunity to be heard in open court and did not have his deposition taken on the statements made in his affidavits. The basis for the District Court's judgment with respect to credibility was a comparison of Ganiaris' sworn statements with largely unexplained documentation from the Struthers-General Foods cases.

The patents themselves are commercially substantial. At the time the lawsuit was commenced, Struthers had sold two freeze concentration plants to General Foods, two plants to a coffee company in Germany and a plant to a company in Brazil (A540-541). General Foods had also paid $1,400,000 to Struthers for a fully paid license under six of the patents in settlement of a lawsuits between them.

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* *General Foods Corporation* v. *Struthers Scientific & Int. Corp. and Struthers Wells Corporation*, Civil Action Nos. 3566, 3665 and 3666, U.S. District Court for the District of Delaware.

The Court of Appeals has sanctioned the judgment of the District Court, and adopted it as the law in the Third Circuit. No clue was given by the Court of Appeals, which affirmed without opinion, as to why it has chosen, at this time, to ignore such precedent in that Circuit as *Tomalewski* v. *State Farm Life Ins. Co.*, 494 F.2d 882, 884 (3rd Cir. 1974), which held that summary judgment was a "drastic remedy" which "may not be granted where there is the *slightest doubt* as to the facts," or its recent decision in *Federal Laboratories, Inc.* v. *Barringer Research Limited*, 696 F.2d 271, 274 (3rd Cir. 1982) which held that a court "*is [not] . . . at liberty to disbelieve the good faith statements of experts contained in depositions and presented by the non-moving party.*"*

This Court has been asked to grant a writ of certiorari to the Court of Appeals for the Third Circuit because the result reached below is dangerous and far exceeds the limits of summary judgment procedure. If allowed to stand, it could encourage other courts to adopt the practice of the courts below to cut off a litigant's right to trial by jury. This Court has admonished the lower courts that summary judgment is authorized under Rule 56, Fed. Rules Civ. Proc. "only where the moving party is entitled to judgment as a matter of law, where it is quite clear what the truth is, . . . [and where] no genuine issue remains for trial . . . [for] the purpose of the rule is not to cut litigants off from their right of trial by jury if they really have issues to try." *Poller* v. *Columbia Broadcasting System, Inc.*, 368 U.S. 464, 467 (1962), citing *Sartor* v. *Arkansas Natural Gas Corp.*, 321 U.S. 620, 627 (1944).

This case also presents a subsidiary, but precedentially important question with respect to whether a sale of *apparatus* which is capable of performing only one major part of a unitary *process* comprising two major parts, may properly be held to constitute a prior sale or offer for sale of the patented process under 35 U.S.C. § 102(b). The District Court held in the affirmative. It also held that a sale of such apparatus could constitute a § 102(b) sale of the entire apparatus required for performing the com-

* Emphasis is added unless otherwise noted.

plete process. These determinations have gone far beyond the present state of the law on the subject of the "on sale" bar under § 102(b). The cases hold that a patent covering a process is not infringed by the manufacture of a machine used in the process. *B.B. Chemical Co.* v. *Ellis*, 117 F.2d 829, 833-834 (1st Cir. 1941); aff'd. 314 U.S. 495 (1942). Furthermore, for purposes of § 102(b), the sale of apparatus must be considered for what it is, *not for what it may be combined with. Aro Mfg. Co.* v. *Convertible Top Replacement Co.*, 365 U.S. 336, 344-345 (1961).

Thus, the Court is presented here with questions which are important both with respect to the administration of justice under the Federal Rules of Civil Procedure relating to summary judgment and to the proper scope of the "on sale" provision of 35 U.S.C. § 102(b), which should be settled by this Court pursuant to Rule 17.1(c) of the Supreme Court Rules.

History of The Struthers FreCon System

1. Early Work at Struthers

The history of the development of the patented inventions and of the relationship between Struthers and General Foods and the lawsuits between them is significant because all of the evidence on which the District Court granted summary judgment of invalidity was taken from the files of the Struthers-General Foods lawsuits and submitted by Nestle in its motions as exhibits to the affidavits of counsel.

Struthers Wells Corporation, parent of the Struthers companies herein, is a manufacturer of crystallizers and other process equipment for the chemical, petroleum and electrical utilities industries (A538). In 1958, it began to apply its know-how in controlled crystallization to the broad field of ice crystallization (A539) and was later awarded United States government contracts to carry out work on freeze desalination of water (A65).

In 1962, Struthers initiated studies at its Warren, Pennsylvania laboratory to determine whether its ice crystallization processes could be used for food product and beverage applications. Orange juice, vinegar, apple juice, tea and coffee extract were freeze concentrated in the laboratory using an ice crystallization

process for various food companies including General Foods and Nestle (A540).

In late 1963, General Foods expressed an interest in the process for use both in its BirdsEye Division for concentrating orange juice and by its Maxwell House Division for concentrating coffee extract. BirdsEye Division asked if Struthers could demonstrate the process in an operating plant of significant size, rather than on the laboratory scale then available in Warren.

Struthers designed and assembled a demonstration freeze concentration plant which it mounted on a railroad flat car so that it could be moved from place to place. The activities concerning General Foods' use of the mobile plant are of significance because the District Court below relied upon them as establishing the invalidity of a number of the patents in suit. It did so on the basis of unexplained documents from this period.

2. *The Mobile FreCon Plant*

The mobile freeze concentration (FreCon) plant was shipped for the first time in early April, 1964 to General Foods' BirdsEye plant at Winter Haven, Florida for testing on orange juice. While it was there and after testing had begun on orange juice, persons at General Foods' Maxwell House Division at Hoboken, New Jersey and White Plains, New York, requested that test runs also be made on coffee extract. Coffee extract prepared by General Foods was shipped in a refrigerated railroad car to Winter Haven from Tampa, Florida and was successfully concentrated in the mobile plant although much difficulty was encountered at the time with foam and insoluble precipitates (wax).

When wax was encountered in connection with the mobile plant at Winter Haven, in May, 1964, a stop-gap measure used at the time was to pass the extract through a crude filter consisting of layers of cheesecloth.

The District Court held that the removal of wax at that time by filtering it through cheesecloth demonstrated the simplicity and obviousness of the dewaxing process and constituted a prior offer for sale, sale and use of the (Reimus, et al.) patents relating

to dewaxing and prior offer for sale and sale of the (Muller) patents for freeze concentration under 35 U.S.C. § 102(b). The Court also held that it proved the falsity of Ganiaris' affidavit, in which he stated that "prior to January, 1965, General Foods did not even appreciate that a dewaxing operation was necessary." (A399). This judgment of credibility was not only improper under the rules for summary judgment but the District Court was wrong in so holding as the facts show.

3. *Struthers Contracts With General Foods*

From early January, 1964, in a separate but parallel development to its mobile plant activities, Struthers' personnel were engaged in designing a freeze concentration system for installation by the Maxwell House Division of General Foods at Hoboken, New Jersey. General Foods entered into a contract with Struthers, on August 12, 1964, for the purchase of freeze concentration equipment. The contract provided for *testing and development work* on freeze concentration of coffee and for nondisclosure and ownership of developments made in the course of the work performed under the contract.

The fact that the freeze concentration process was in a developmental state at the time in question, should have raised serious doubts in the mind of the District Court with respect to whether they were, in fact, completed as required for a determination of invalidity under 35 U.S.C. § 102(b). If Petitioners had been given an opportunity to present evidence of this type at trial, there might have been a different outcome below. It is for that very reason that courts have been, and should be, reluctant to grant summary judgment where there is the slightest question as to the facts.

Equipment for the construction of the freeze concentration plant began to arrive at Hoboken in about November or early December, 1964 and the plant was started up shortly thereafter, in January, 1965 (A 675-683). When coffee extract was fed to the system for the first time on February 4, 1965, a number of operating difficulties arose including excessive foaming and wax formation which caused plugging of the centrifuges used in the system (A 677-678). Dewaxing equipment was installed for the

first time at Hoboken in early March, 1965 and by late March or early April, 1965.

The testing and development work performed by Struthers in connection with the use of the mobile FreCon plant at Winter Haven, Florida for BirdsEye Division and in the construction and development of freeze concentration systems for Maxwell House at Hoboken pursuant to the contract of August 12, 1964 and a later contract of September 30, 1965, led to several related lawsuits between Struthers and General Foods in which Struthers charged General Foods with infringement of six of its patents, misappropriation of trade secrets and other unfair practices. These lawsuits continued unabated from 1968 to 1972 when the parties entered into a settlement agreement pursuant to which General Foods took a fully paid license under the patents.

The numerous and interrelated facts with respect to Struthers' development of freeze concentration processes and apparatus, the testing and building of such systems for General Foods and the prior art and the work of the inventors and others in the field, are the facts on which the summary judgment motions rest. They are disclosed in the discovery documents and depositions taken by the parties in the General Foods lawsuits and were appended to the affidavits of counsel for Nestle and argued in the motions for summary judgment.

Although these numerous facts were subject to interpretation, and although they were of paramount importance herein, no testimony was taken, in this case, to explain them. This Court held in *Adickes* v. *S.H. Kress & Co.*, 398 U.S. 144, 176 (1970) that "[T]he advantages of a trial before a live jury with live witnesses, and all the possibilities of considering the human factors, *should not be eliminated by substituting trial by affidavit and the sterile bareness of summary judgment.*"

The Proceedings Below

Struthers Patent Corporation commenced the present action against Nestle on April 13, 1972. It charged Nestle with infringement of ten United States patents, including the six pat-

ents which it had previously asserted against General Foods, and made a demand for a jury trial.

Nestle responded by alleging invalidity and noninfringement of Petitioners' patents and included counterclaims for a declaratory judgment with respect to such allegations and for unfair competition.* Struthers Wells Corporation and Struthers Scientific & International Corporation were added by Nestle as defendants on the counterclaims.

The District Court held that the case presented no genuine issues of fact and granted summary judgment against Petitioners on the grounds that the patents were obvious (35 U.S.C. § 103), had been sold or offered for sale more than one year prior to their filing date (35 U.S.C. § 102(b)), and failed to contain a full, clear and exact description of the subject matter claimed (35 U.S.C. § 112) (A31-508).

The Court of Appeals heard oral argument on March 1, 1983. On March 28, 1983, the Court of Appeals affirmed the judgment of the District Court without opinion (A1). A petition for rehearing in banc was denied by the Court of Appeals on April 25, 1983 (A3).

REASONS FOR GRANTING THE WRIT

The District Court, with the sanction of the Court of Appeals, has far exceeded the limits of summary judgment procedure and has preempted Petitioners' right of trial by jury. It has set a precedent which, if allowed to stand, will seriously erode the right of litigants to a trial and create confusion with respect to the "on sale" bar under 35 U.S.C. § 102(b).

The District Court:

1. *resolved* numerous issues of material fact: it did so by first deciding that no expert testimony was required to understand

* The counterclaim for unfair competition has not been advanced beyond the pleading stage and remains to be discovered and tried after final adjudication of the instant Rule 54(b), Fed. Rules Civ. Proc., appeal.

the patents and then, on the basis of its own analysis of the patented inventions, the level of skill in the art, and the nature and scope of the prior art, holding that the patents are directed to obvious and unpatentable subject matter;

2. held six of the patents invalid for prior sale or offer for sale under 35 U.S.C. § 102(b) based on documents which were unexplained by any testimony and *controverted* by affidavits which Struthers submitted in opposition to the motion; in this regard the Court misapplied the law with respect to the "on sale" defense by holding that a sale of apparatus which was *not* capable by itself of performing a substantial and necessary part of the patented process may constitute an invalidating prior sale under § 102(b); and

3. judged the credibility of a witness whose affidavits were submitted in opposition to the motions for summary judgment. In doing so, the District Court chose to disregard a substantial and critical portion of the evidence submitted by Struthers on such determinative issues as the "on sale" defense, the nature and scope of the patented inventions and of the prior art. As a result, the District Court failed to heed this Court's instruction that "*On summary judgment the inferences to be drawn from the underlying facts contained in such materials [affidavits, exhibits, depositions submitted below] must be viewed in the light most favorable to the party opposing the motion.*" *United States* v. *Diebold, Inc.*, 369 U.S. 654, 655 (1962).

I. Certiorari Should Be Granted To Establish The Limits Beyond Which Summary Judgment May Not Be Substituted For A Trial

By deciding as complicated and involved a case as this on summary judgment, the District Court had to make certain factual findings or assumptions on which to support the overall decision. It did so by first deciding that no expert testimony was required to understand the subject matter of the patents and prior art:

> "I have concluded, however, *that this is a case where the opinion of experts is not necessary*, and that I can

> and should decide the § 103 issue on the basis of the undisputed facts which are in the record. *The technology involved is not complex.* We are not dealing with difficult chemical, physical, mathematical or electronic concepts or devices. Rather, the patents involved (the '007 and '522 patents and also the other eight patents in suit) *are readily understandable and concern processes and devices which employ familiar concepts*". (A191)

Having decided that it understood the technology involved and was capable of making the determinations required by this Court in *Graham* v. *John Deere & Co.*, 383 U.S. 1 (1966), the District Court resolved the factual inquiries mandated by that case.

> "As an examination of the prior art record discloses, this subject matter is a well ploughed field. For decades patents have been filed, articles written, and research and development undertaken in every phase of freeze concentration processes and equipment. The same record discloses that the skill in the art by this late date is very high. *Not only is the skill in the art high, the subject matter is relatively simple, easily understandable by a person having limited or no technical background in this field.*" (A52-53)

Under 35 U.S.C. § 103, Congress set out a practical test of patentability in the form of three factual inquiries, the third of which entails resolving the level of ordinary skill in the pertinent art.

Since the decision of this Court in *Graham* v. *John Deere & Co.*, *supra*, the circuit courts have recognized that the determination of the level of skill in the art to which the subject matter of the patent in suit pertains involves several factual elements. The Court of Appeals for the Federal Circuit lists six factors which may be relevant in ascertaining the level of ordinary skill in the art as follows*:

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* *Orthopedic Equip. Co.* v. *All Orthopedic Appliances, Inc.*, 707 F.2d 1376, 1382 (Fed.Cir. 1983).

> (1) The educational level of the inventor; (2) the various prior art approaches employed to solve the problem; (3) the types of problems encountered in the prior art; (4) the rapidity with which innovations were made in the field of the patent in suit; (5) the sophistication of the technology involved in the field; and (6) the educational background of those actively working in the field.

Nowhere in the prolix opinion of the District Court were any of the foregoing factors utilized to ascertain whether a genuine issue of fact existed with respect to the level of ordinary skill in the art of freeze concentrating comestible liquids. The Court's response to petitioners' strenuous argument that the third factual inquiry could not be made without the assistance of expert testimony; that it had done so in the form of an affidavit of Ganiaris; that respondent Nestle had submitted nothing in opposition; and that even if Nestle did submit opposing affidavits on the subject to contradict Ganiaris' sworn statements, factual issues would persist precluding summary judgment, was that Petitioners' points did not present an obstacle to summary judgment because ". . . this is a case where the opinions of experts is not necessary and . . . I can and should decide the § 103 issue on the basis of the undisputed facts which are in the record" (A191). In other words, the District Court resolved the ordinary level of skill in the art by completely disregarding the Petitioners' affidavit evidence on the matter and deciding the issue for itself based on its bare reading of the prior art patents and other references.

In thus dispensing with the third factual inquiry promulgated by the Congress and mandated by this Court, the District Court committed basic error that should not be allowed to stand to confound future patent litigations. Petitioners submit that the procedure which the District Court followed is not only an aberration of long accepted principles of summary judgment but also of the fundamental approach to an analysis of patent validity set out in the patent statutes and mandated by this Court for determining the non-obviousness or obviousness of a United States patent. This is a case which truly warrants the attention of this Court for the grave reason that a District Court should

not be permitted to disregard good faith affidavits submitted in opposition to a motion for summary judgment, especially where such affidavits are directed to the level of skill in the art, the affiant is a person skilled in the art and the District Court is not such a person. *Federal Laboratories, Inc.* v. *Barringer Research, Ltd., supra.*

A practical, cogent and compelling demonstration of the need for expert assistance in understanding and evaluating the patents in suit and prior art in this case is to be found in the decision of Judge Latchum in *Struthers Scientific & Int. Corp.* v. *General Foods Corp.*, 314 F.Supp. 313, 315 (D. Del. 1970), where the court held on a motion for summary judgment involving *three of the same patents in suit here* (patent Nos. 3,381,302; 3,404,007; and 3,449,129):

> . . . "Were this Court skilled in the art it might be a simple matter to answer the questions required by the *John Deere case, but this Court frankly admits that it lacks that special knowledge which would permit it to read the patents in suit so understandably, in terms of obviousness to a man of ordinary skill in the art, on the basis of the present record.* This determination must await a fuller treatment of these conditions by *expert testimony*, now lacking in the present record." *Struthers Scientific & Int. Corp.* v. *General Foods Corp.*, 314 F.Supp. 313, 315 (D. Del. 1970)

It is inexplicable to Petitioners why three of the patents in suit could be understood without difficulty by the District Court below, but not by the District Court in Delaware. It reflects, however, in practical application, the dangers inherent in the unrestricted use of summary judgment procedure. By making determinations, which it should not otherwise have made without explanatory testimony, the District Court below was able to hold the patents invalid for obviousness under 35 U.S. § 103 while the District Court in Delaware was not.

It is apparent that if the decision below is left undisturbed, the district courts and courts of appeal will have been given a

substantial and stunning precedent with which to foreclose a litigant's right of trial by jury.

This Court has cautioned against such a result in *Poller* v. *Columbia Broadcasting, supra:*

> "This rule [Rule 56(c), Fed.Rules Civ.Proc.] authorizes summary judgment 'only where the moving party is entitled to judgment as a matter of law, where it is quite clear what the truth is . . . [and where] no genuine issue remains for trial . . . [for] the purpose of the rule is not to cut litigants off from their right to trial by jury if they really have issues to try.' " [Citing *Sartor* v. *Arkansas Natural Gas Corp.*, 321 U.S. 620, 627 (1944)].

II. Certiorari Should Be Granted To Prevent An Unprecedented And Unwarranted Extension Of The "On Sale" Bar Under 35 U.S.C. § 102(b)

The District Court summarily held six of the ten patents in suit invalid on the grounds that their subject matter had been sold or placed on sale more than one year prior to the respective filing dates of the applications that led to such patents. Petitioners contend that such holding constitutes an unwarranted extension of the strictures of § 102(b) and error as a matter of law.

1. Muller '007 and '522 Patents

The Muller patents, No. 3,404,007 (A 716) and No. 3,495,522 (A 720), claim a process and apparatus, respectively, for the freeze concentration of coffee extract in combination with a freeze drying step. The applications for these patents were held entitled to a filing date of January 28, 1966. In terms of prior sale under 35 U.S.C. § 102(b), the critical date for these patents is January 28, 1965 (A224).

The District Court accepted as true and the Circuit Court affirmed that the only sale by Struthers to General Foods prior to the critical date was the Struthers-General Foods contract of August 12, 1964 (A226-227). The District Court also accepted as

true that the contract did not provide for the sale of any freeze drying apparatus, process, technology or know-how (A226-227).

The District Court held that Struthers had made offers for sale of freeze concentration processes and equipment prior to the critical date with the "expectation" that it would be used by the purchaser in conjunction with a freeze drying step (A227). The District Court held and the Third Circuit affirmed that this constituted a § 102(b) statutory bar to patentability (JA 145).

An essential inquiry in connection with the "on sale" bar under § 102(b) relates to the degree of identity required between that which is placed on sale and the patented invention. Although exact identity between the two is not required, there must exist at least *substantial identity* between them.

In *DeLong Corporation* v. *Raymond International, Inc.*, 622 F.2d 1135, 1141 (3rd Cir. 1980), the Court held:

> "In order to sustain a finding of invalidity under the 'on sale' bar of 35 U.S.C. § 102(b), it must be shown that the alleged invalidating sale was of a device *substantially identical* to that claimed under the terms of the patent. See *Red Cross Manufacturing Corp.* v. *Toro Sales Co.*, 525 F.2d 1135 (7th Cir. 1975)."

The *Red Cross* case, *supra*, at 1141-42, cited in *DeLong*, *supra*, sets forth the test for substantial identity:

> ". . . *a necessary determination must be whether the item placed 'on sale' sufficiently embodied the invention described in the patent in suit* to invoke the bar of § 102(b). . . . Exact identity is not required as long as the invention is essentially completed at the time of the invalidating sale. . . ."
>
> * * *
>
> "In order for the 'on sale' bar to apply, *the patent claims at issue must describe the invention offered for sale*. . . ."

A sale of the FreCon apparatus would not, by itself, constitute a § 102(b) sale of the process patent because it does not have

sufficient identity with the invention claimed in the patent to infringe.

The First Circuit, in *B.B. Chemical Co.* v. *Ellis*, 117 F.2d 829, 833-34 (1st Cir. 1941), aff'd. 314 U.S. 395 (1942), held that a patent covering a process is not infringed by the manufacture of a machine for use in the process:

> ". . . *The manufacture of the machine by the defendants is not an infringement of the plaintiff's process patent.* . . . 'So distinctively [sic] and separate in the patent law are process and apparatus for utilizing such process that where, after a patent for a process by one invention, a second inventor might patent a novel apparatus for utilizing the process. . . . *It will therefore be evident that the test of process infringement is not the similarity of apparatus, but rather whether the apparatus, no matter what its form, utilizes the process.*' . . ."

In *Plax Corporation* v. *Precision Extruders*, 239 F.2d 792, 795 (3rd Cir. 1957), the Third Circuit agreed that the "test of infringement of a process patent is whether the . . . machine employs every essential of the patented method." The freeze concentration apparatus sold by Struthers is incapable of performing freeze drying. It *cannot* infringe the patented process for freeze concentration in combination with freeze drying. It lacks sufficient identity to the claimed invention to constitute a § 102(b) sale thereof.

In *Deepsouth Packing Co.* v. *Laitram Corp.*, 406 U.S. 518, 528 (1972), *reh. den.* 409 U.S. 902 (1972), the Court held:

> ". . . that 'a combination patent protects only against the operable assembly of the whole and not the manufacture of its parts."

The District Court held that the *combination* of freeze concentration apparatus and freeze drying apparatus was "the *essence* of the alleged . . . inventions" (JA 144). But Struthers never sold freeze drying apparatus to anyone.

This Court, in *Aro Mfg. Co.* v. *Covertible Top Replacement Co.*, 365 U.S. 336, 344-45 (1961), held:

> ". . . if anything is settled in the patent law, it is that *the combination patent covers only the totality of the elements in the claim and that no element, separately viewed, is within the grant.* See the *Mercoid* cases, *supra*, 320 U.S., at 667; 320 U.S., at 684. *The basic fallacy in respondent's position is that it requires the ascribing to one element of the patented combination the status of patented invention in itself.* Yet this Court had made it clear in the two *Mercoid* cases that *there is no legally recognizable or protected 'essential' element, 'gist' or 'heart' of the invention in a combination patent.* . . ."

Since Struthers did not sell to General Foods the complete apparatus claimed in the '422 patent, and since the entire process claimed in the '007 patent could not have been performed by the FreCon apparatus alone, it could not have made a § 102(b) sale of the inventions claimed in these patents to General Foods at any time.

2. *The Reimus Dewaxing Patents*

The Reimus et al. patents (U.S. patents Nos. 3,381,302; 3,449,129; 3,632,353; and 3,474,723) relate to the removal of insoluble precipitate materials (wax) which form in coffee extract when it is cooled or allowed to stand for various periods of time. These materials, when present in the extract, interfere with the process of removal of ice crystals during freeze concentration. The problem is that "continued exposure to low temperature will also cause the formation of a non-waxy particulate precipitate. This particulate precipitate forms after the formation of insoluble tars, waxes and gums . . . exposure to low temperatures sufficient to cause this particulate precipitate should be avoided because it is tantamount to degradation of the coffee extract. The resulting concentrated product . . . is not as satisfactory to the consumer. . . ." Thus, if one were merely to precipitate material from coffee extract without regard to tem-

perature or holding time, the resultant coffee product would be unsaleable.

The District Court held that the processes and apparatus claimed in the Reimus patents were placed on sale, sold and used in May, 1964 when Struthers was demonstrating its FreCon mobile plant to General Foods in Winter Haven, Florida. The Court held it had become "obvious [at that time] that it was necessary to remove the tars which plugged the centrifuge during the freeze concentration process" (A400). The removal of waxy materials was accomplished by pouring the coffee extract through cheesecloth to filter it before freeze concentrating.

As the District Court said:

> "The question becomes whether the indisputable facts as to the devising and use of dewaxing procedures in May, 1964, when Struthers was demonstrating its FreCon unit, and General Foods' subsequent (pre-December 2, 1964) decision to use such procedures in connection with the freeze concentration equipment purchased from Struthers, is an invalidating sale or use under § 102(b). . . ." (A401)

The District Court decided that the dewaxing inventions were "very simple and obvious" and held that they were offered for sale, sold or used during the test runs at Winter Haven in May, 1964. The Court notes in its opinion "how easily" the problem was solved at that time:

> *"I have concluded, however, that the entire subject matter of the Reimus patents involves very simple (and I later find obvious) concepts.* The skill in the applicable art is very high. *(Note how easily the persons working on the 'FreCon' unit in May, 1964, were able to solve the problem of gummy, waxy concentration clogging the centrifuge during the freeze concentration process.)* There can be no doubt that one skilled in the art *(and also one having only negligible skill in the art)* can adjust the various factors of temperature, concentration of extract, and holding time

to obtain concentrated coffee extract having the desired flavor." (A407-408)

This Court, in *Poller* v. *Columbia Broadcasting, supra*, has held at page 473:

> "We believe that summary procedures should be used sparingly in complex antitrust litigation where motive and intent play leading roles, the proof is largely in the hands of the alleged conspirators, and hostile witnesses thicken the plot. It is only when the witnesses are present and subject to cross-examination that their credibility and the weight to be given their testimony can be appraised. Trial by affidavit is no substitute for trial by jury which so long has been the hallmark of 'even handed justice.' "

Similar issues relating to motive and intent are present with respect to the holding of invalidity of the Reimus et al. patents for prior sale or offer for sale under 35 U.S.C. § 102(b). The questions relating to whether these patented inventions were in fact placed on sale are questions of fact which were decided by the District Court in the affirmative. But the District Court decided these fact questions after holding that the statements contained in the affidavits of Petitioners' patentee and expert witness, Ganiaris, were *untrue*. To hold that Mr. Ganiaris swore falsely in his affidavits is, at the least, unfair considering he had never been cross-examined by Nestle with respect to the affidavits nor was he ever given the opportunity to testify on the subject in open court. The District Court judged Ganiaris' credibility on the basis of documents taken from the Struthers-General Foods lawsuits as interpreted and described by counsel for Nestle (A383-384, A399). If Ganiaris had been given an opportunity to testify at trial, the outcome might have been different because his first-hand observations of what took place during the time period in question were much more relevant to the issues than the arguments of Nestle's counsel.

In his affidavit Mr. Ganiaris said that "prior to January, 1965, General Foods did not even appreciate that a dewaxing operation was necessary" (A633). The District Court found this state-

ment to be "patently false" (A399). The Court based this finding on Struthers' activities at Winter Haven in May, 1964 when coffee extract was filtered through cheesecloth; on Struthers' answer to General Foods' Interrogatory 6 in which that incident was described; and on a memorandum of Martin Gottesman, a General Foods employee, dated September 23, 1964, more than a year after the event, describing the necessity of prefiltering coffee extract in the Struthers mobile unit (A401-403).

It was plainly improper for the District Court to assess as false Ganiaris' statement on so subjective a matter as what General Foods "appreciated." Ganiaris was Struthers' project engineer in connection with the design, construction and operation of the freeze concentration plant which it built for Maxwell House at Hoboken, New Jersey. He was in a position to know whether General Foods truly "appreciated" the necessity for a dewaxing operation. The facts, contrary to the holding of the District Court, support Mr. Ganiaris and demonstrate that General Foods indeed did *not* fully "appreciate" the necessity for a dewaxing step prior to January, 1965.

Ganiaris knew that dewaxing equipment was not included in the freeze concentration plant which Struthers designed and built for General Foods pursuant to the contract of August 12, 1964 (A633). It was not until after the plant was started up in January, 1965 that the full extent of the problem with wax became appreciated (A633). The first recognition of this problem in a real sense occurred in February, 1965 when runs on coffee extract were commenced and it was not until at least March of that year that it was corrected.

The Struthers mobile FreCon plant had no dewaxing facilities. If the wax problem was "appreciated" by General Foods before January, 1965 why was it not included in the contract, or at least in the FreCon plant installed at Hoboken?

A memorandum from Ganiaris to Struthers' employee, J.G. Muller, dated February 15, 1965 entitled "Subject: Maxwell House FreCon Unit," (A 675) reflects that the initial freeze concentration test runs on sugar solutions were satisfactory to Maxwell House management through the week of January 24.

It was not until later that the wax problem arose as the following records show:

". . . The first stage was operated for 2 hours on Feb. 4 with coffee extract. *The unit was shut-down due to foam and wax.*

On February 5, a 4-hour run was made and the first stage was shut-down due to the failure of one flexible connection on the crystallizer. However, a thick layer of wax was observed on the centrifuge screen. There was not any problem with foam. . . .

5. *Week of 2/7—24 hour Day*

a) *On February 8 and 9,* several attempts were made to operate the first stage with coffee extract. However, continuous operation for more than 30 minutes was impossible due to wax.

At a meeting held on 2/10, SSI and MH engineers decided on the following:

* * *

2. Dewax a large quantity of extract and operate the system on a close-cycle until the permanent dewaxing equipment is installed.

3. *Initiate laboratory test on wax by MH-Research Division.*

* * *

4. *SSI will design the dewaxing equipment on the basis of the laboratory data.*

5. Install all dewaxing equipment by the first week of March.

* * *

Conclusions and Recommendations

* * *

> 3. *Wax in the Extract: This problem did not receive the proper attention from either organization, MH or SSI.* Unless the two companies clarify their position with respect to the following points, further delays will occur. . . ."

It is apparent from the Ganiaris memorandum that the dewaxing problem persisted despite continued efforts to effect a solution for at least nine months after the time that the District Court held that it was so "easily" solved and sold to General Foods in May, 1964. The problem with wax continued at General Foods at least until February, 1965 when Ganiaris noted that "This problem did not receive the proper attention from either organization, MH [Maxwell House] or SSI." The inference favorable to Struthers to be drawn from this fact, is that the invention was *not* completed at the time of the alleged sale and, therefore, *not* sold under 35 U.S.C. § 102(b) at the time.

Thus, the District Court not only grossly exceeded the proper limits of summary judgment procedure by drawing factual inferences in favor of the moving party, it compounded its error by judging Ganiaris' credibility on the basis of its reading of the documentary exhibits submitted in connection with the motions. The District Court should not have been permitted to do this. *United States* v. *Diebold, Inc.*, 369 U.S. 654, 655 (1962). Therefore, the Court of Appeals' adoption of the opinion below requires the exercise by this Court of its supervisory power under Rule 17.1(a) of the Supreme Court Rules to prevent further impermissible distortions of summary judgment practice in the federal courts.

CONCLUSION

It is respectfully requested that a writ of certiorari issue to review the judgment of the United States Court of Appeals for the Third Circuit.

Respectfully submitted,

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UNITED STATES COURT OF APPEALS
FOR THE THIRD CIRCUIT

No. 82-5355

STRUTHERS PATENT CORPORATION, a corporation organized and existing under the laws of the State of Texas

v.

NESTLE COMPANY, Inc., a corporation organized and existing under the laws of the State of New York

v.

STRUTHERS WELLS CORPORATION and STRUTHERS SCIENTIFIC AND INTERNATIONAL CORPORATION,

Defendants on Counterclaim

Struthers Patent Corporation, Struthers Wells Corporation, and Struthers Scientific & International Corporation,

Appellants

Appeal from the United States District Court for the District of New Jersey - Trenton
(D.C. Civil Action No. 663-72)
District Judge:
Honorable Dickinson R. Debevoise

Argued March 1, 1983

Before HUNTER, WEIS and BECKER,
Circuit Judges

JUDGMENT ORDER

After consideration of all contentions raised by appellant, it is

ADJUDGED AND ORDERED that the judgment of the district court be and is hereby affirmed. See opinion of Dickinson R. Debevoise, United States District Judge, Civil Action No. 663-72, Joint Appendix Vol. I, A-41, et seq., ___ F.Supp. ___.

Costs taxed against appellant.

BY THE COURT,

s/James Hunter, III
JAMES HUNTER, III, Circuit Judge

Attest:

s/Sally Mrvos
Sally Mrvos, Clerk

Dated: March 28, 1983

UNITED STATES COURT OF APPEALS FOR
THE THIRD CIRCUIT

No. 82-5355

STRUTHERS PATENT CORPORATION, a corporation organized and existing under the laws of the State of Texas

v.

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v.

STRUTHERS WELLS CORPORATION and STRUTHERS SCIENTIFIC AND INTERNATIONAL CORPORATION,

Defendants on Counterclaim

Struthers Patent Corporation, Struthers Wells Corporation, and Struthers Scientific & International Corporation,

Appellants

SUR PETITION FOR REHEARING

Present SEITZ, Chief Judge, ALDISERT, ADAMS, GIBBONS, HUNTER WEIS, GARTH, HIGGINBOTHAM, SLOVITER, BECKER, Circuit Judges

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The petition for rehearing filed by

STRUTHERS PATENT CORPORATION, STRUTHERS WELLS CORPORATION, and STRUTHERS SCIENTIFIC & INTERNATIONAL CORPORATION

in the above entitled case having been submitted to the judges who participated in the decision of this court and to all the other available circuit judges of the circuit in regular active service, and no judge who concurred in the decision having asked for rehearing, and a majority of the circuit judges of the circuit in regular active service not having voted for rehearing by the court in banc, the petition for rehearing is denied.

By the Court,

s/James Hunter
Judge

Dated: April 25, 1983

UNITED STATES DISTRICT COURT
DISTRICT OF NEW JERSEY

STRUTHERS PATENT CORPORATION,	:	
Plaintiff,	:	
v.	:	Judge Debevoise
THE NESTLE COMPANY, INC.,	:	Civil Action No. 663-72.
Defendant,	:	
v.	:	
STRUTHERS WELLS CORPORATION, and STRUTHERS SCIENTIFIC INTERNATIONAL CORPORATION	:	
Additional Defendants: on Counterclaim.		

FINAL ORDER
(RULE 54(b), F.R.CIV.P.)

Defendant ("Nestle") having moved the Court pursuant to Rule 37, F.R.Civ.P., for an order imposing sanctions against the plaintiff and the defendants on counterclaim (collectively, "Struthers")

for the alleged destruction of relevant documents; the Court having referred said motion to a Special Master for supervision of discovery, an evidentiary hearing, and preparation of a report and recommendations thereon; the Special Master having recommended that the motion be denied; Struthers having moved the Court to confirm the Special Master's report and to deny Nestle's motion for sanctions; and Nestle having filed objections to the Special Master's report and recommendations; and

Nestle having by a series of four motions moved the Court pursuant to Rule 56, F.R.Civ.P., for summary judgment of invalidity and or unenforceability of each of the ten patents asserted against it in this action; and Struthers having filed papers in opposition thereto; and

The Court having considered each of the aforesaid motions, the records made

by the respective parties before the Court and before the Special Master, and the briefs, affidavits and other submissions made in connection therewith, and having heard oral argument thereon; and having on October 13, 1981 filed its written opinion deciding each of the said motions; and

Nestle having thereafter made application pursuant to Title 35, United States Code, Section 285, that this action be determined to be exceptional within the meaning of said statutory provision, and that its reasonable attorney fees and disbursements be awarded to Nestle; and further application for an order to vacate the recommendations of the Special Master and to reconsider the denial of discovery sanctions; and

The Court having denied each of the said two applications on April 5, 1982,

for reasons expressed in the opinions read into the record on that date;

IT IS ORDERED AND ADJUDGED:

1. The Court has jurisdiction of the parties and of the subject matter of this action.

2. The report and recommendations of the Special Master on Nestle's sanctions motion are adopted, modified and/or rejected to the extent and in the manner set forth in the Court's opinions filed October 13, 1981, and read into the record on April 5, 1982 (on reconsideration).

3.(a) Nestle's motion for summary judgment as to Muller United States Letters Patent 3,404,007 is granted, and said Letters Patent are declared to be invalid and void as to each claim thereof

by reason of obviousness in view of the prior art, 35 U.S.C. §103; and by reason of prior offer for sale, sale and use, 35 U.S.C. §102(b); and as to claim 5 because it claims merely the product of an old and known process.

(b) Nestle's motion as to Patent 3,404,007 is denied as to the asserted grounds that Struthers is collaterally estopped to relitigate the prior determination of unpatentability of the subject matter claimed in the patent; that the patent fails to comply with the requirements of 35 U.S.C. §112; by reason of Struthers' withholding of material information from the Patent Office; and as to claim 5 that Struthers' acquiescence in the examiner's rejection of the product-by-process claim in the "Muller II" application (Serial No. 738,776) constituted a cancellation, surrender and abandonment of the claim;

(c) The Court does not at this time determine whether Patent 3,404,007 is invalid by reason of anticipation by prior patents or publications, 35 U.S.C. §102(b); or whether, if the process is assumed to be new, claim 5 of said patent is invalid on the grounds that the product is not patentably different from freeze dried soluble coffee described in the prior art, or by reason of failure to comply with Patent Office regulations.

4.(a) Nestle's motion for summary judgment as to Muller United States Letters Patent 3,495,522 is granted, and said Letters Patent are declared to be invalid and void as to each claim thereof by reason of obviousness in view of the prior art, 35 U.S.C. §103; and by reason of prior offer for sale, sale and use, 35 U.S.C. §102(b).

(b) Nestle's motion as to Patent

3,495,522 is denied as to the asserted grounds of late claiming, and by reason of Struthers' withholding of material information from the Patent Office.

(c) The Court does not at this time determine whether Patent 3,495,522 is invalid by reason of anticipation by prior patents or publications, 35 U.S.C. §102(b); or double patenting and extension of the monopoly of Patent 3,404,007.

5.(a) Nestle's motion for summary judgment as to Ganiaris United States Letters Patent 3,531,295 is granted, and said Letters Patent are declared to be invalid and void as to each claim thereof by reason of obviousness in view of the prior art, 35 U.S.C. §103; and by reason of failure to comply with the requirements of 35 U.S.C. §112.

(b) Nestle's motion as to Patent 3,531,295 is denied as to the asserted grounds that the application upon which the patent issued became abandoned by operation of law; that the patent is invalid under 35 U.S.C. §102(f); that the patent is invalid by reason of prior offer for sale, sale and use, 35 U.S.C. §102(b); and by reason of Struthers' withholding of material information from the Patent Office.

(c) The Court does not at this time determine whether Patent 3,531,295 is invalid by reason of anticipation by prior patents or publications, 35 U.S.C. §102(b); or whether the patent is invalid under 35 U.S.C. §102(d).

6.(a) Nestle's motion for summary judgment as to Ganiaris United States Letters Patent 3,620,034 is granted, and said Letters Patent are declared to be

invalid and void as to each claim thereof by reason of obviousness in view of the prior art, 35 U.S.C. §103.

(b) Nestle's motion as to Patent 3,620,034 is denied as to the asserted grounds that the application upon which the patent issued became abandoned by operation of law; that the patent is invalid by reason of prior offer for sale, sale and use, 35 U.S.C. §102(b); for failure to comply with the requirements of 35 U.S.C. §112; and by reason of Struthers' withholding of material information from the Patent Office.

(c) The Court does not at this time determine whether Patent 3,620,034 is invalid by reason of anticipation by prior patents or publications, 35 U.S.C. §102(b); or whether the patent is invalid by reason of double patenting.

7.(a) Nestle's motion for summary judgment as to Reimus. et al. United States Letters Patent 3,381,302 is granted, and said Letters Patent are declared to be invalid and void as to each claim thereof by reason of obviousness in view of the prior art, 35 U.S.C. §103; and by reason of prior offer for sale, sale and use, 35 U.S.C. §102(b).

(b) Nestle's motion as to Patent 3,381,302 is denied as to the asserted grounds that Struthers failed to prosecute the application for patent in the manner required by law; that the application upon which the patent issued became abandoned by operation of law; that the patent fails to comply with the requirements of 35 U.S.C. §112; and by reason of Struthers' withholding of material information from the Patent Office.

(c) The Court does not at this time determine whether Patent 3,381,302 is invalid by reason of anticipation by prior art patents or publications, 35 U.S.C. §102(b).

8.(a) Nestle's motion for summary judgment as to Reimus et al. United States Letters Patent 3,449,129 is granted, and said Letters Patent are declared to be invalid and void as to each claim thereof by reason of obviousness in view of the prior art, 35 U.S.C. §103; by reason of prior offer for sale, sale and use, 35 U.S.C. §102(b); and because the patent claims subject matter given up during prosecution of the application for Patent 3,381,302.

(b) Nestle's motion as to Patent 3,449,129 is denied as to the asserted grounds that Struthers failed to prosecute the application for patent in

the manner required by law; that the application upon which the patent issued became abandoned by operation of law; that the patent fails to comply with the requirements of 35 U.S.C. §112; that the patent is invalid for want of a legally adequate oath or declaration; and by reason of Struthers' withholding of material information from the Patent Office.

(c) The Court does not at this time determine whether Patent 3,449,129 is invalid by reason of anticipation by prior art patents or publications, 35 U.S.C. §102(b); or whether the patent is invalid by reason of double patenting.

9.(a) Nestle's motion for summary judgment as to Reimus et al. United States Letters Patent 3,632,353 is granted, and said Letters Patent are declared to be invalid and void as to

each claim thereof by reason of obviousness in view of the prior art, 35 U.S.C. §103; by reason of prior offer for sale, sale and use, 35 U.S.C. §102(b); and because the patent claims subject matter given up during prosecution of the application for Patent 3,381,302.

(b) Nestle's motion as to Patent 3,632,353 is denied as to the asserted grounds that Struthers failed to prosecute the application for patent in the manner required by law; that the application upon which the patent issued became abandoned by operation of law; that the patent fails to comply with the requirements of 35 U.S.C. §112; that the patent is invalid for want of a legally adequate oath or declaration; and by reason of Struthers' withholding of material information from the Patent Office.

(c) The Court does not at this time determine whether Patent 3,632,353 is invalid by reason of anticipation by prior art patents or publications, 35 U.S.C. §102(b); or whether the patent is invalid by reason of double patenting.

10.(a) Nestle's motion for summary judgment as to Reimus et al. United States Letters Patent 3,474,723 is granted, and said Letters Patent are declared to be invalid and void as to each claim thereof by reason of obviousness in view of the prior art, 35 U.S.C. §103; and by reason of prior offer for sale, sale and use, 35 U.S.C. §102(b).

(b) Nestle's motion as to Patent 3,474,723 is denied as to the asserted grounds that Struthers failed to prosecute the application for patent in the manner required by law; that the application upon which the patent issued

became abandoned by operation of law; that the patent fails to comply with the requirements of 35 U.S.C. §112; that the patent is invalid for want of a legally adequate oath or declaration; and by reason of Struthers' withholding of material information from the Patent Office.

(c) The Court does not at this time determine whether Patent 3,474,723 is invalid by reason of anticipation by prior art patents or publications, 35 U.S.C. §102(b); or whether the patent is invalid by reason of double patenting.

11.(a) Nestle's motion for summary judgment as to Howell United States Letters Patent 3,367,126 is granted, and said Letters Patent are declared to be invalid and void as to each claim thereof by reason of obviousness in view of the prior art, 35 U.S.C. §103.

(b) Nestle's motion as to Patent 3,367,126 is denied as to the asserted grounds that the patent fails to comply with the requirements of 35 U.S.C. §112; that the patent is invalid by reason of prior offer for sale, sale and use, 35 U.S.C. §102(b); and by reason of Struthers' withholding of material information from the Patent Office.

(c) The Court does not at this time determine whether Patent 3,367,126 is invalid by reason of anticipation by prior art patents or publications, 35 U.S.C. §102(b).

12.(a) Nestle's motion for summary judgment as to Ganiaris United States Letters Patent 3,636,722 is granted, and said Letters Patent are declared to be invalid and void as to each claim thereof by reason of failure to comply with the requirements of 35 U.S.C. §112; and

because the subject matter was first patented by Struthers in a foreign country prior to the date of the application for patent in this country on an application for patent filed more than twelve months before the filing of the application for patent in this country, 35 U.S.C. §102(d).

(b) Nestle's motion as to Patent 3,636,722 is denied as to the asserted grounds that Struthers is collaterally estopped to relitigate the prior determination of unpatentability of the subject matter claimed in the patent; and by reason of Struthers' withholding of material information from the Patent Office.

(c) The Court does not at this time determine whether Patent 3,636,722 is invalid by reason of anticipation by prior art patents and publications, 35 U.S.C. §102(b); or obviousness in view of

the prior art, 35 U.S.C. §103; or prior offer for sale, sale and use, 35 U.S.C. §102(b).

13. Plaintiff shall take nothing of defendant, and shall have no recovery on its complaint in this action.

14. The complaint in this action is hereby dismissed.

15. The first count of Nestle's counterclaim is hereby sustained.

16. This action is determined not to be exceptional within the meaning of Title 35, United States Code, Section 285, and Nestle's application for an award of its reasonable attorney fees and disbursements is denied, for reasons expressed in the Court's opinion read into the record on April 5, 1982.

17. Nestle shall be allowed costs of this action which shall be taxed when and in the event it ultimately prevails.

IT IS FURTHER ORDERED AND ADJUDGED:

18. The Court having determined that there is no just reason for delay, it is directed that this judgment be entered as a final judgment pursuant to Rule 54(b), F.R.Civ.P. In so directing, the Court has taken account of the following factors and considerations, inter alia:

A. The complaint in this action alleges that the ten Struthers patents identified therein, and dealt with hereinabove, are valid and infringed. The first count of the counterclaim seeks a declaratory judgment that the same ten patents are invalid and not infringed.

B. The Court has determined all ten patents to be invalid, thus disposing of the issues raised by the complaint, which is accordingly dismissed. That determination likewise disposes of the issues raised by the first count of the counterclaim (as a matter of law an invalid patent cannot be infringed), upon which Nestle shall have judgment, and the first count is accordingly sustained.

C. The patent issues presented by the complaint and by the first count of the counterclaim arise exclusively under federal law (Title 28, United States Code, Sections 1338(a), 2201 and 2202). By contrast, the non-patent issues involved in the second count of the counterclaim remaining for future determination arise in part under state law. The second count of the

counterclaim is for unfair competition, including malicious abuse of process.

D. The Court has jurisdiction of the second count under Title 28, United States Code, Section 1338(b) and over the parties thereto. The second count is not facially defective, frivolous or otherwise legally insufficient.

E. Only the plaintiff and the defendant are parties to the complaint and the first count of the counterclaims. Two other parties (both related to the plaintiff) have been joined as additional parties on the second count of the counterclaims. In 1973 the Court (per Lacey, J.) in denying motions by the additional parties to dismiss determined that the Court does have jurisdiction of their persons and that the second count does state a claim

upon which relief can be granted. In 1976 the Court (per Meanor, J.) permitted the additional parties to file a responsive pleading and to demand trial by jury of the second count.

F. An action for malicious abuse of process cannot be heard until the prior action has terminated favorably to the party asserting such abuse. As the Court's 1973 opinion recognizes, however, under Rule 18(b), F.R.Civ.P., such a claim may as a matter of pleading be asserted as a counterclaim before termination of the prior action.

G. The unfair competition and malicious abuse of process issues remaining for determination are separate and distinct from the patent issues which have been determined by this Court. As noted above, additional parties are

involved on those of the former issues raised by the second count of the counterclaims. Moreover, the Court's jurisdiction to determine the malicious abuse of process aspect of the second count depends on Nestle's having prevailed on some or all of the patent issues dealt with in this order. Entry of final judgment on the patent issues would not prevent the remaining non-patent issues in the case from being prepared for trial, as to which discovery is required.

H. The issues remaining for determination, as well as the scope of proof as to the remaining issues, will be materially affected by appellate affirmance, reversal or modification of this order. As one example, should the determination of invalidity of one or more of the ten patents be set aside on

appeal, that matter would have to be determined before proceeding to the issues raised by the second count. As another example, should it be determined on appeal that Nestle is entitled to relief on its sanctions motion, e.g., that designated facts pertinent to the second count be taken as established for purposes of the action in accordance with Nestle's claim, or that Struthers not be permitted to oppose designated claims, the shape and content of future proceedings could be markedly affected.

I. It is accordingly concluded to be evident that appellate review at this juncture will both facilitate and render more orderly the future proceedings in this action. Such review will also minimize the risk of subsequent retrial and reduce the potential burden on both the trial and appellate Courts. Such

review would not be mooted by any future development in the trial Court, and the Court has concluded that its determination of the issues decided herein would not be changed by later developments in the trial Court relating to the disposition of the remaining issues to be tried, viz., those raised by the second count of the counterclaim. Neither would the appellate Court be required to decide a second time any legal issues relating to already adjudicated claims. The Court has also determined that the second count of the counterclaim poses no possibility of a set-off because no judgment was awarded plaintiff on the complaint.

J. The Court has therefore concluded that there is no just reason for delaying entry of final judgment as to the issues determined herein; and that judicial

economy, sound judicial administration, and the speedy determination of this action, which has pended for more than 10 years, are best served by the entry of a judgment pursuant to F.R.Civ.P. 54(b).

s/Dickinson R. Debevoise
DICKINSON R. DEBEVOISE
United States District Judge

Dated: May 6, 1982

UNITED STATES DISTRICT COURT
DISTRICT OF NEW JERSEY

STRUTHERS PATENT CORPORATION,

Plaintiff,

v.

THE NESTLE COMPANY, INC.,

Defendant,

v.

STRUTHERS WELLS CORPORATION, et al.,

Additional Defendants on Counterclaim.

Civil Action No. 663-72.

OPINION

DEBEVOISE, District Judge.

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Appendix A

INTRODUCTION

Plaintiff, Struthers Patent Corporation, filed its complaint on April 13, 1972, alleging that defendant, The Nestle Company, Inc., was infringing ten Struthers patents by its manufacture and sale of soluble coffee. Nestle denied infringement and asserts that each of the patents is invalid and unenforceable. Nestle filed a counterclaim seeking, in one Count, a declaratory judgment of invalidity and unenforceability of each of the ten patents and asserting, in a second Count, a claim alleging unfair competition. Nestle joined as defendants on the counterclaim two corporations which are affiliated with plaintiff -- Struthers Wells Corporation and Struthers Scientific and International Corporation. The three affiliated corporations will be referred to collectively as "Struthers".

The case has had a protracted pretrial history. Two matters are now ripe for disposition: (i) Struthers' motion to confirm the report and recommendation of a special master concerning sactions to be imposed by reason of Struthers' destruction of relevant documents prior to institution of this action, and (ii) Nestle's motions for summary judgment of invalidity and/or unenforceability of the ten patents in suit.

For the reasons which are set forth in Parts I through V of this opinion, the findings of the special master will be adopted in part, modified in part, and rejected in part, but his recommendation that no sanctions be imposed will be adopted; Nestle's motions for summary judgment of invalidity of the ten patents will be granted.

A. BACKGROUND

Struthers is in the business of licensing and selling technical information and know-how. It owns the ten patents in suit, which deal generally with freeze concentration in the manufacture of instant or soluble coffee and certain other food products. Nestle is the world's largest seller of soluble coffee.

In simple terms, freeze concentration of coffee extract (derived by brewing coffee from coffee beans) involves removing water from the extract by chilling the extract sufficiently to form ice particles and then removing the ice particles, leaving a more concentrated solution. After the concentration stage the concentrated solution may be dried by various means to form the powder or granules constituting the soluble coffee. Nestle uses a freeze drying

process but denies that it freeze concentrates coffee. For the most part the patents in suit contemplate that the freeze concentration processes described therein either will be or may be followed by freeze drying.

Events pertinent to the pending motion took place as early as the mid-1960's. At that time Struthers entered into a contractual relationship with General Foods Corporation to assist General Foods in developing equipment for the freeze concentration of coffee extract. During the course of that relationship Struthers disclosed and sold or offered to sell to General Foods various processes and items of equipment relating to freeze concentration. According to General Foods it did not find the processes or equipment useful in its business and it terminated its relationship with Struthers.

Thereafter extensive litigation between General Foods and Struthers took place, most of which ultimately was consolidated in the United States District Court in Delaware. Struthers charged General Foods with infringement of six of the ten patents at issue in the present action. Each party charged the other with theft of trade secrets and know-how. After extensive discovery and other pretrial proceedings the parties settled, signing a settlement agreement on February 9, 1972.

After February 9 and prior to April 13, 1972, when the present action was filed, Struthers collected and destroyed a very substantial part of the documents and depositions which it had assembled in the course of the General Foods case. This document destruction is the subject of Nestle's motion for sanctions and the special master's report and

recommendation recommending against sanctions.

Nestle filed four motions for summary judgment, each directed to two or more of the ten patents in issue. Four days of hearings on those motions were held. I ruled against Nestle from the bench on certain grounds which it advanced, and I reserved decision on the remaining grounds. Parts II through V of this opinion deal with the remaining grounds.

B. General Comments about the Summary Judgment Motions

Summary judgment of invalidity of a patent is not common. Nevertheless I have concluded that summary judgment of invalidity of each of the ten patents at suit is required in this case.

Nestle filed in support of its summary judgment motions a very extensive record. This record consists of the file

wrappers of the proceedings in the Patent Office relating to each of the ten patents in suit and to certain other applications pertinent to these patents. It consists of documents produced by Struthers to Nestle in this action. It consists of Struthers' answers to interrogatories and deposition testimony of Struthers' officers and employees in this case and in the Struthers/General Foods litigation. It consists of a vast array of prior art, including earlier patents, articles and texts.

Each of the four summary judgment motions was accompanied by three volumes of exhibits, i.e., a volume containing the file wrapper of the patents which were the subject of the motion, a volume containing documents produced by Struthers to Nestle, and a volume of prior art documents. Exhibits referred to in Parts II through V of this opinion

will be found in the pertinent volume relating to the particular motion under discussion. The factual data contained in this material can hardly be disputed, consisting as it does of official records of the Patent Office, Struthers' own statements, and prior art which has not been challenged.

In addition, each party filed affidavits. Struthers' affidavits were designed to demonstrate that there are genuine issues of material fact which preclude summary judgment.

So vast is the record submitted in support of the summary judgment motion that it is a temptation to concluse that, amidst it all, genuine issues of material fact must exist. However, the trial of this case would impose such a heavy burden upon the parties and upon the resources of the Court, particularly as a jury has been requested, that I concluded

that every effort had to be made at this time to comb the record and to determine if such issues do, in fact, exist. This is what I attempted to do, and the necessity to describe for the record the results of this inquiry is the cause of this regrettably (but I think necessarily) long opinion.

Each of Nestle's motions advances six or more grounds why summary judgment of invalidity and/or unenforceability should be granted. I have ruled that as to certain of those grounds the motions should be denied as a matter of law, and that, as to certain others of those grounds, the motions should be denied because as to those grounds there are genuine issues of material facts. I have ruled that each of the ten patents is invalid as a matter of law on one or more grounds. As to each patent except one (the Ganiaris 3,636,722 patent) one

ground of invalidity is obviousness over the prior art, 35 U.S.C. § 103. (The question of obviousness was not reached in the case of the '722 patent, as I concluded that it is invalid on two other grounds.) I did not believe it necessary in the case of any of the patents to determine whether they were also invalid because they were previously described in a patent or other publication, 35 U.S.C. § 102(b), and there were certain other grounds advanced by Nestle upon which I did not rule.

For the purpose of the § 103 contentions it was necessary to make the factual inquiries mandated by Graham v. John Deere Co., 383 U.S. 1 (1966): (i) determining the scope and content of the prior art; (ii) ascertaining the differences between the prior art and the claims in the patents at issue; and (iii) determining if the differences are

such that the claimed subject matter would have been obvious at the time the invention was made to a person having ordinary skill in the art.

The scope and content of the prior art is set forth in great detail in the record and can hardly be disputed. Similarly, the differences between the prior art and the claims in the patents at issue can be readily ascertained by a simple comparison. Struthers has argued strenuously, however, that there is a factual issue as to what was the ordinary skill in the art and as to whether the differences between the prior art and the claims in the patents at issue would have been obvious to a person having such skill. Struthers contends that these questions cannot be resolved without the testimony of experts in the face of affidavits of Struthers' employee, Neophytos Ganiaris, asserting an absence

of obviousness. I will deal with this contention in more detail in Parts II through V of this opinion. Some general observations, however, might be helpful at this point.

The subject matter of the art involved in the present case is freeze concentration and freeze drying in the manufacture of powdered soluble food products. Although coffee is the principal food product under discussion, the same principles and techniques apply to certain other food products as well.

As an examination of the prior art record discloses, this subject matter is a well ploughed field. For decades patentents have been filed, articles written, and research and development undertaken in every phase of freeze concentration process and equipment. The same record discloses that the skill in the art by this late date is very high.

Not only is the skill in the art high, the subject matter is relatively simple, easily understandable by a person having limited or no technical background in this field.

After reviewing the entire record applicable to all ten patents I concluded that it can be determined that there is no genuine issue of fact that the various changes and alleged improvements which Struthers has introduced into the prior art either are no more than cosmetic differences without any patentable significance or else, if they can be seen as improvements, are such as would have been obvious to one skilled in the art. The basis for this conclusion is described in some detail in Parts II through V and should be apparent from a comparison of the prior art and the claims at issue. The situation here is similar to that which prevailed in C-Thru

Products, Inc. v. Uniflex, Inc., 397 F.2d 952, 955 (2d Cir. 1968).

> Appellant now stresses that in patent cases summary judgment is often inappropriate by reason of the necessity to inquire into the scope and content of the prior art, the differences between the prior art and the claims at issue, and the level of ordinary skill in the art . . . In many cases involving a question of patent validity such inquiry involves consideration of technical questions which are often best understood with the aid of expert testimony. But in this case, as Judge Bartels pointed out (Appellants' appendix, p. 6a), the prior art and the patent claims are not complex and are easily understandable without expert aid. This is one case where it truly would be 'an absurd waste of time and effort' to deny summary judgment.

Three other matters should be mentioned by way of introduction.

Nestle urges that by reason of Struthers' misconduct in procecuting various of the patents involved in this case, at the very least Struthers should be denied the benefit of the presumption of validity accorded by 35 U.S,C. § 282. As will be described in some detail in

Parts II through V, Struthers persistently violated Patent Office rules when prosecuting the applications leading to these patents. This resulted in major voids in the Patent Office records, often making it impossible to determine why an examiner acted as he did. For example, often one cannot tell from the file wrapper why an examiner who had found a claim to be invalid over the prior art reversed himself. More disturbing, though less frequent, are the situations in which Struthers changed its factual position. From time to time, both in proceedings before the Patent Office and during the course of this litigation, Struthers simply changed its factual statements when expedient to do so. I deal with this more extensively, particularly in Part II. If this were the trial of the case, it might well be that the presumption of validity would be

affected. However, for the purpose of the summary judgment motions I have assumed that Struthers is entitled to the full benefit of the presumption.

Another point which might be noted preliminarily is the fact that I am being asked to grant a summary judgment of invalidity of ten patents which, prior to their issuance, were reviewed and ultimately approved by a number of different patent examiners, each an expert in the field of patents. I think, however, that after reviewing all the prior art relating to all ten of the patents, and after reviewing all of the patents them selves, I am in a better position to evaluate the validity issues than were the examiners.

I have had the benefit of being able to review all of the patents, all of the file wrappers, and all of the prior art at the same time. These patents are

intimately related to each other, and the prior art of one is frequently prior art of another. My conclusion of obviousness of one patent was fortified and confirmed as I moved on to each succeeding patent and its prior art.

None of the patent examiners had the opportunity to view these patents and the prior art in a unified presentation. Much of the prior art was never before them. In the case of some of the applications a number of examiners were assigned, none seeing the application through from start to finish. A candid statement by William A. Drucker, patent counsel and an officer of Struthers, describes the pressures under which these patent examiners worked:

> What often happens -- this is what I want to explain -- examiners are under a production quota, and they are concerned with disposition of cases, and part of their system is to

> make proposals to patent attorneys saying, 'If you will make the following changes, I think I can see my way to allowing this language and letting the case get off my desk.'
>
> Sometimes the proposal of the examiner on its face is quite acceptable. Sometimes it requires some conversation before final version is agreed upon. This is, I might say, or usually it happens on a Friday or it used to at the time these cases we are concerned with because examiners had weekly quotas for disposal of cases. That was the normal natural working in the Patent Office, at least in the coffee arts. I can't comment now on every single art, but in the part dealing with food and coffee a lot of the examiners at that time were under such high pressure from the Commissioner's Office to get rid of cases, to avoid an appeal if at all possible. In fact were under positive instructions to issue patents as opposed to rejecting them.
>
> (Transcript of Hearing, June 16, 1981, at 18.)

Given all this, it is neither surprising nor an adverse reflection on the examiners that in the unusual circumstances of this case I find myself in a better position to determine certain issues of validity than they were.

There is one final point I wish to make before turning to the individual motions. I am more confident in my conclusions by reason of the fact that each party has been represented by extraordinarily able counsel. Each legal issue has been briefed and argued exhaustively. Each side has probed the record and has, I am sure, discovered and impressed upon me every fact or circumstance supporting its position. In writing this opinion I have drawn extensively upon the briefs of both sides. For example, I have treated Nestle's accounts of the prosecution of the pertinent patent applications as proposed findings of undisputed facts and, after checking them against the record, have modified and (as modified) adopted them.

I turn now to the five pending motions.

I. The Special Master's Report

In December, 1975 Nestle filed a motion pursuant to Fed.R.Civ.P. 37 seeking sanctions against Struthers for an alleged destruction by Struthers just prior to the institution of this action of a very substantial quantity of documents relevant to the issues in this action.

These documents were voluminous in nature and were assembled during the course of the litigation between Struthers and General Foods Corporation. In that action Struthers asserted against General Foods six of the ten patents which it now asserts against Nestle.

Judge Meanor, to whom the case was then assigned, reviewed the papers which Nestle submitted in support of its motion for sanctions on account of the document destruction, and he heard argument on the

motion. As set forth in his opinion filed September 15, 1976, he concluded that he was "unable to determine from the written record what documents were destroyed or how they related to the issues in this action". Further, on the record before him, he was unable to "determine the appropriateness of the many forms of sanctions sought by Nestle". He reserved decision until a hearing could be conducted.

In order that resolution of the document destruction issues would not delay prosecution of the other phases of this case I appointed The Honorable Harold R. Tyler, Jr., a former United States District Court Judge, Special Master to supervise discovery, conduct hearings, and file a report containing his findings of fact, conclusions of law, and recommendations with respect to the document destruction charge. Inquiry

into the following factual and legal questions was to be made: (i) identification, with as much specificity as possible, of the documents which were destroyed; (ii) the relationship of those documents to the issues in the present action; (iii) the extent to which such documents can now be obtained from other sources; (iv) whether Struthers knew or should have known at the time it caused the destruction of the documents that litigation against Nestle on the patents at issue was a distinct possibility, and (v) whether, in the light of the circumstances disclosed by the factual inquiry, sanctions should be imposed upon Struthers and, if so, what the sanctions should be.

By pretrial order #2 Judge Tyler was appointed Special Master. Thereafter very extensive work was performed by the Special Master and the parties with

respect to the document destruction phase of the case. Had it not been for the efforts of the Special Master, it would have been impossible for me to have proceeded with the discovery and summary judgment phases of the case.

On June 8, 1981 the Special Master filed his report and recommendations, which concluded that no sanctions should be imposed upon Struthers. Struthers filed a motion to confirm the Special Master's report and to deny Nestle's motion for sanctions. Nestle filed objections to the report and recommendation. A hearing on the motion and objections was held on September 10, 1981. Most of the grounds of Nestle's objections are addressed in this Part I. In view of my conclusions set forth below it is unnecessary to address the remaining grounds.

A. The Destroyed Documents

During the course of the General Foods litigation Mr. Drucker, patent counsel and an officer of Struthers, was in general charge of assembling and controlling documents. He arranged for all Struthers' documents pertaining to freeze concentration to be assembled and sent, ultimately, to the Texas law firm representing Struthers in that litigation, Fulbright and Jaworski. Mr. Drucker retained in his own custody the files relating to the processing of the pertinent patent applications. Through the discovery process in the General Foods litigation depositions were acquired and thousands of documents produced. Struthers kept these documents in Houston and copies were kept by Mr. Drucker in New York City, by John G. Muller, a Vice President of one of the Struthers companies, in Washington, D.C.,

and by Struthers' Delaware counsel in Wilmington, Delaware. In addition, the Fulbright firm sent to Westheimer Transfer & Storage Co., Inc., for storage, certain documents which included those known as the Office of Saline Water ("OSW") documents. These were documents relating to work carried out by Struthers for the Office of Saline Water, United States Department of the Interior.

A protective order was entered in the Delaware Federal District Court in the General Foods litigation covering some, but by no means all, of the depositions and documents produced by General Foods. It provided, in part:

> 2. At the conclusion of this litigation, all information received by any party from an opposing party and designated as secret, or determined to be secret by Court order, shall be deposited by the party then in possession of it in a secure place, still subject to the terms of this order, protected from access by any person other than a person authorized to see it by the

> terms of this order, or the terms of some subsequent Court order. (Emphasis added.)

On February 9, 1972 Struthers and General Foods signed an agreement terminating their litigation.

At Mr. Drucker's instructions, some OSW documents had been destroyed at the Westheimer warehouse on January 12, 1972. Struthers can give no explanation of this destruction, which took place just prior to a court-ordered document inspection by General Foods of the OSW documents. The remaining documents stored at Westheimer were destroyed on March 7, 1972, pursuant to Mr. Drucker's instructions.

On February 14 or 15, 1972 (less than a week after the Struthers-General Foods settlement agreement was signed) Mr. Drucker ordered that all the General Foods litigation documents be shipped to Houston for destruction. The exact dates

when the destruction of the documents in Houston took place (except for the documents destroyed on January 12 and March 7, 1972 in the Westheimer warehouse) is not known precisely. Many were probably destroyed in late February and early March, 1972. Some must have been destroyed in or after May, 1972, when Struthers' Delaware attorneys shipped documents to Houston in response to Mr. Drucker's instructions.

On March 6, 1972, Mr. Muller burned the documents under his control in Washington, D.C. Struthers' Delaware counsel destroyed certain of the documents in their control in February, 1972 and, as mentioned above, shipped others to Houston in May, 1972

Mr. Drucker's files contained documents underlying or pertaining to the patents in suit in the present case or relating to freeze concentration. This

included documents relating to the prosecution and the file history of abandoned, pending and issued applications. These were destroyed, according to Struthers, as a "routine housekeeping practice" and "began in the early 1960s and continued subsequent to April 13, 1972" (the date when Struthers filed its complaint against Nestle).

The Special Master found that this document destruction program resulted in the destruction of the following categories of documents:

1. Copies of transcripts of depositions of General Foods personnel.

2. Copies of exhibits marked during the depositions of General Foods personnel.

3. Copies of documents, which copies were produced to Struthers by General Foods in the course of discovery.

4. All copies of the OSW records

except copies of government contracts and a North American Aviation contract.

5. Copies of Struthers' correspondence and related materials pertaining to customers or potential customers of Struthers for a period during the mid-1960s.

6. Materials in the files of Struthers designated as "privileged" in relation to the litigation with General Foods.

7. Copies of documents in the files of Struthers relating to the prosecution and file history of some or all of the freeze concentration patents here in suit.

This finding requires a modification to reflect two events which occurred during the proceedings before the Special Master.

Shortly before the March 21, 1981 hearing before the Special Master,

Struthers reported that "portions" of its customer correspondence in the mid-1960s had been discovered. Thus at least part of the customer records previously reported to have been destroyed evidently were not destroyed and, very belatedly, have been produced. The day before the hearing before the Speoial Master Nestle was informed that the original index cards of documents from the Struthers-General Foods litigation were in existence and in the possession of Struthers' counsel. Early in this litigation Struthers denied the existence of such a list. With these modifications, the findings of the Special Master as to the documents which were destroyed are supported by the record and will be adopted.

B. Struthers' Knowledge of Impending Litigation

The Special Master found that "the

record does not indicate when Struthers decided to institute suit against Nestle, nor does it establish who, acting on behalf of Struthers, made that decision. The complaint herein was filed April 13, 1972." This is a correct finding.

In addition, however, I believe it necessary to determine whether Struthers knew or should have known at the time it caused the destruction of the documents that litigation against Nestle on the patents at issue was a distinct possibility. The Special Master did not make a specific finding on this point, but the record leaves no question as to what the answer to this question must be.

Struthers' proposed Contentions of Fact filed with the Special Master conceded that "After the settlement of the General Foods litigation, Struthers knew or should have known that litigation against Nestle on the patents at issue in

its present action against Nestle was contemplated."

A recital of Struthers' position on this issue is pertinent, because it bears upon Struthers' motives when destroying the documents and it bears upon its good faith in the present proceedings.

In 1976, in opposition to Nestle's motion for sanctions, Struthers filed an affidavit of Mr. Drucker which stated in part:

> 10. I also want to emphasize that at the time the documents were destroyed Struthers had not turned its attention to preparation for litigation with Nestle and indeed was not prepared for litigation with anyone. I was not at that time aware of any plan by Struthers to conduct further litigation nor have I subsequently become aware that such a plan was in existence at that time.
>
> 11. * * * Struthers has not concealed from Nestle any information appropriate to the matters in dispute in the present litigation. From the beginning of the present litigation until this time there has been absolutely no document destruction on

> behalf of Struthers. Indeed, no document destruction occurred from the moment that litigation between Struthers and Nestle was contemplated by Struthers. [Emphasis in original.]

In its Interrogatory 81(a)(C)(xii) Nestle had requested Struthers to identify "memoranda of counsel, diary and timebook entries of counsel and employees of respondents, bills and statements of counsel", etc. In its answers (which list William Drucker, James Weiler and Dudley Dobie (of the Fulbright firm) of counsel), Struthers responded:

> Objection is made to identification of memoranda of counsel, diary and timebook entries of counsel and bills and statements of counsel on the basis of privilege. However without waiving the foregoing objection, there are no such documents relating, pertaining, referring to or bearing upon the foregoing. In addition, there are no other documents of the nature requested. (Emphasis added.)

Nestle also served further document requests (Nos. 7-9) relating to destruction, to which Struthers replied:

"there are no documents relating to the solicitation or giving of advice concerning document destruction."

Discovery of the Fulbright firm's time sheets in the proceedings before the Special Master disclosed that Mr. Drucker's statements and the answers to these interrogatories were not true.

It will be recalled that the Struthers-General Foods settlement agreement was signed on February 9, 1972 and that Mr. Drucker issued the document destruction orders on February 14 or 15, 1972. The Fulbright records show that on February 11, 1972, Mr. Drucker entered into discussions with the Fulbright firm regarding the disposition of documents and institution of new legal proceedings. The Fulbright and Jaworski time record of Dudley R. Dobie dated February 11, 1972, reads as follows:

Conf. T. Clark re document retention;

> T/T W.A. Drucker re doc. disposition and new litigation; continue review of files for storage. (Chargeable Hours Card No. 000037; Tab. 18.)

Mr. Dobie testified that the new litigation mentioned in his card referred to either Nestle or Coca-Cola (Dobie Tr., p. 192.)

During February, 1972 letters proposing non-exclusive licenses were sent over the signature of Struthers' litigation counsel, Mr. Weiler, to Nestle and several other companies in the soluble coffee industry. Those letters were dated February 15, 1972, the very time when Mr. Drucker issued his instructions for the destruction of documents.

Again, on February 22, 1972, Mr. Dobie had another telephone conversation with Mr. Drucker regarding the Nestle matter. His Time Card of that date reads as follows:

> T/T Drucker re Nestle matter and re storage of files. (Fulbright and Jaworski Chargeable Hours Card No. 000002, Tab. 19.)

On February 23, 1972 -- the same date on which the order of dismissal was filed in the Delaware District Court terminating the Struthers/General Foods litigation -- Mr. Drucker had further discussions with the Fulbright lawyers regarding the Nestle litigation. Mr. Dobie's Time Card for February 23, 1972 reads as follows:

> T/T Richards re entry of Order of Dismissal; T/T W.A. Drucker re Nestle litigation; review Rule 60 requirements re Court's jurisdiction after judgment; investigate jurisdiction re Nestle litigation. (Fulbright and Jaworski Chargeable Hours Card No. 000001, Tab. 20; emphasis added.)

On the same date Mr. Drucker also conferred with James F. Weiler, the partner in charge of the litigation. Weiler's Time Card for February 23, 1972

reads:

> Confer Drucker re bringing suit against Nestle in Houston; drafting Complaint and venue questions; confer Dobie re same. (Fulbright and Jaworski Chargeable Hours Card No. 000161, Tab. 21; emphasis added.)

Confronted with these records, Struthers had little choice but to concede that at the time it caused the destruction of the documents it knew or should have known that litigation against Nestle on the patents at issue was a distinct possibility. The Special Master's report will be modified to include a finding to the effect that Struthers had actual knowledge that such litigation was a distinct possibility at the time of its destruction of documents in and after February, 1972. Further, there will be included a finding that during the course of the present litigation Struthers sought to conceal

the fact that it had such knowledge until, during the proceedings before the Special Master, it was confronted with records from its former attorneys' files -- which demonstrated that Struthers' original contentions in this regard were untrue.

C. Relationship of the Documents to the Issues

The Special Master did not make findings as to the relationship of the destroyed documents to the issues in the present action, perhaps because it is so obvious that each category of destroyed documents (with the possible exception of the OSW documents) was likely to contain relevant information or material which might lead to relevant information.

The General Foods litigation in which the destroyed documents were assembled

included a number of separate actions, the claims in which were eventually dealt with in the district court action in Delaware. Struthers filed actions in Texas charging that General Foods was infringing certain of Struthers' patents. General Foods began a declaratory judgment action with respect to the patents in Delaware and thereafter the Texas actions were transferred there. As additional patents were issued to Struthers, additional infringement actions were filed by Struthers in Delaware. Ultimately, six patents (all in suit in the instant action) were in suit in Delaware. In addition, Struthers filed an action in the New York State courts alleging theft of trade secrets by General Foods. General Foods' amended complaint in Delaware also contained a count alleging unfair competition by reason of Struthers' wrongful

misappropriation of General Foods' confidential information and Struthers' use of that information to obtain the Muller '007 patent (see Part II of this opinion) and the Reimus '302 dewaxing patent (see Part IV of this opinion). The relationship of the unfair competition and patent claims was discussed in General Foods Corp. v. Struthers Scientific and International Corp., 297 F. Supp. 271 (D. Del. 1969).

The six patents asserted against General Foods are among the ten patents which are the subject of this suit and of Nestle's summary judgment motion. They are dealt with in this opinion as follows:

Part II - Both patents in this group, viz., Muller 3,404,007 and Muller 3,495,522, were in suit in Delaware.

Part III - Ganiaris 3,531,295 and Ganiaris 3,620,034 were not in suit in Delaware. Their disclosure of washing the ice to recover coffee solids is, however, included in the

claims of other of the patents which were in suit.

Part IV - Reimus 3,381,302, Reimus 3,449,129 and Reimus 3,474,723 were in suit in Delaware. The fourth Reimus patent (3,632,353) purports to derive from the same applications.

Part V - Of the two hollow agitator shaft patents, Howell 3,367,126 was in suit in Delaware; Ganiaris 3,636,722 was not.

In Documentary Requests Nos. 1-6 in the present action Nestle asked for all documents and other products of discovery in the General Foods-Struthers litigation. Concluding that this was a proper subject of discovery, Judge Lacey, who was then handling this case, entered an order on February 15, 1973 which provided, in part:

> That Defendant's [Nestle's] motion to compel Respondents [all three Struthers companies] to produce for inspection and copying all documents which are the subject of Defendant's first documentary request (Nos. 1-6) is hereby GRANTED, except insofar as such documents have been produced or marked as Defendant's Deposition

Exhibits in this litigation. Having heard Nestle's summary judgment motions before addressing the document destruction issues, I am able to evaluate the relationship between the destroyed documents and major issues in the case. There can be no question that Judge Lacey correctly concluded that the documents generated in the earlier litigation are pertinent to the present case.

Given the fact that six of the ten patents involved in the present action were the subject of the earlier action, and that the present and former actions involve similar claims and defenses, transcripts of the depositions of General Foods personnel, copies of exhibits marked during those depositions, and copies of documents produced to Struthers by General Foods in the earlier litigation must be highly relevant in the

present action. Among other things, they would bear upon the validity of Struthers' patents under paragraphs (a), (b), (f) and (g) of 35 U.S.C. § 102 and under 35 U.S.C. § 103.

There is a dispute between the parties as to the relevance of the OSW documents which involved a development program for freeze desalination of water which Struthers had undertaken for the United States government. Nestle contends that freeze concentration and desalination are essentially the same process and therefore Struthers' work on desalination would bear upon its freeze concentration efforts. Struthers, on the other hand, urges that the processes are essentially different and that the OSW documents produced in the General Foods action related to issues unrelated to patent validity. There is insufficient evidence in the record to make a finding

on the relevance of these documents in the present litigation, but, of course, destruction of the documents compounds the difficulty of making such a determination.

The Special Master recited Struthers' rationale for destroying its correspondence and related materials pertaining to customers or potential customers for the period during the mid-1960s: "Struthers made the decision to destroy these documents because of their age and because of the view of Struthers' counsel, at the time of destruction, that such documents were wholly irrelevant to any litigation with Nestle or any other company."

The conclusion of Struthers' counsel in this regard (if, indeed, he did so conclude) was unjustified. As the summary judgment motions in this case amply demonstrate, an important basis for

attacking the validity of Struthers' patents is that the subject matter claimed in the patents was offered for sale or sold more than one year prior to the applications therefor, 35 U.S.C. § 102(b). Correspondence with customers during the mid-1960s, a period one year or more prior to the applications for the patents now in litigation, had potential relevance to the on sale defense. It is inconceivable that Struthers' counsel, an experienced patent attorney who had only recently wrestled with this issue in the General Foods litigation, would not have appreciated the significance of this kind of document.

Whether or not the materials in the files of Struthers designated as "privileged" in the General Foods litigation is discoverable in the present action, they are in all likelihood relevant to the issues now before the

Court. Given the substantial overlap of the patents involved in the present and former case and the similarity of the patent claims and defenses, much of the "privileged" materials, like the General Foods case deposition transcripts, exhibits and documents, must bear upon the issues in this case.

The documents in Struthers' files relating to the prosecution and file history of some or all of the freeze concentration patents now in suit also had a potential relevance in the present case. It became evident during the review of the papers in support of Nestle's motions for summary judgment (papers which were not available to the Special Master) that there are major deficiencies and gaps in the Patent Office files of the prosecution of the pertinent patent applications. This will be developed more fully in Parts II

through V of this opinion. Suffice it to say at this point that it is quite likely that Struthers' files would have filled these gaps and helped explain or amplify questions relating to the prosecution of the patents. Thus, the destroyed files were also potentially relevant to the issues in this case.

Inasmuch as the Special Master made no findings as to the relevance of the destroyed documents to the issues in the present case, his report and recommendation will be modified to include the factual findings contained in this section C.

D. Present Availability of the Destroyed Documents

The Special Master's findings with respect to the present availability of the destroyed documents appear at different places in his report and recommendation, quite often in connection

with his discussion of other issues. I shall discuss them as they apply to each category of documents destroyed. There is one general observation in the report which is incorrect.

At page 11 of the report it is stated: "That deposition [of General Foods Delaware counsel] reveals that the Connolly firm has copies of all or virtually all of the materials destroyed by or at the direction of Struthers in 1972." The following discussion of the present availability of the documents will show that the conclusion is too broad.

Turning now to the present availability of the seven categories of documents:

The Special Master found (at pp. 8,9) that "Copies of the transcripts of depositions of General Foods personnel, together with the exhibits thereto, are

still in existence and in the possession of Messrs. Connolly, Bove & Lodge of Wilmington, Delaware, attorneys for General Foods. The same law firm also is currently in possession of copies of documents which were produced by General Foods to Struthers in the course of the General Foods litigation." This finding is amply supported by the deposition testimony of Paul Crawford taken during discovery undertaken in connection with the proceedings before the Special Master.

The Special Master also found that "the originals of [the documents which were produced by General Foods to Struthers] appear to be still in the possession of General Foods". This finding has some support in the record in the form of deposition testimony of Michael J. Quillinan, General Foods' Manager of Patent Litigation, given in October, 1972. However, according to

that testimony, the original documents, contained in five five-drawer filing cabinets, are not assembled in one place. The documents probably had been returned to the places from which they had come. In the words of Mr. Quillinan: "The simplest way would be to simply return to the corporate arms that provided these documents, the various haystacks there of that existed. And I am not sure that even today [October, 1972] such haystacks exist. They may be in the form of hay. Where and what degree they are stacked, I really cannot say."

Thus it is highly probable that the original documents were still in the possession of General Foods at the start of the Struthers litigation against Nestle. However, it also appears that they had been scattered throughout General Foods' corporate departments. It

had required strenuous discovery efforts on Struthers' part to obtain production of those documents in the earlier litigation. That work, in all likelihood, would have had to have been repeated by Nestle if it sought to obtain the documents from General Foods. Its task would have been complicated by the fact that General Foods is not a party to the present litigation.

However, it appears, as the Special Master found, that the first three categories of documents are available in that they are in the possession of General Foods' Delaware counsel and that, at least in October, 1972, General Foods had the original category 3 documents scattered throughout the corporation's offices.

As to the availability of the remaining four categories of documents, the Special Master made the additional

finding that the items referred to in categories 4, 5, 6 and 7 above "were in fact received from Struthers by General Foods". From this it might be inferred that the documents were therefore available in the files of General Foods' counsel. The finding on which this inference is based is clearly erroneous, at least as to categories 4, 6 and 7. The finding will not be adopted.

As to category 4, some of the OSW records were destroyed on January 2, 1972 before General Foods' inspection, and it is not known whether General Foods made copies of the balance of the OSW records which were inspected by General Foods and which Struthers subsequently destroyed. At page 9 of his report and recommendation the Special Master wrote: "I note that there is some evidence that the originals of the OSW records may still be in the possession of the United

States Government." This observation can only be applicable to OSW documents which were generated by or submitted to the United States government. It cannot be applicable to Struthers' internal documents relating to the OSW project.

Further, according to evidence submitted by Nestle long after the Special Master had filed his report and recommendation, the government's copies of the OSW documents were disposed of even before Struthers destroyed its copies in 1972.

As to category 5, it may well be that General Foods did receive copies of Struthers' customer correspondence, although discovery in connection with the document destruction proceeding raises a question as to whether it received all such documents. It now seems likely that most of the customer records have finally been located through Nestle's discovery

efforts during the proceeding before the Special Master.

As to category 6, pursuant to the order of the Delaware district court, General Foods received copies of a portion of the documents as to which Struthers claimed a privilege. It did not receive those which were not ordered to be produced. The Special Master recognized this fact and he may have intended to limit the overly broad language appearing on page 6 of his report by the observation appearing on page 9 to the effect that "copies of some, at least, of the Struthers files designated 'privileged' in the litigation with General Foods are currently to be found in the offices of Messrs. Connolly, Bove and Lodge" (emphasis added).

As to category 7, General Foods did not receive Mr. Drucker's prosecution and file history. As found by the Special

Master, it did receive very substantial documentation relating to freeze concentration, including laboratory note books, data sheets, weekly reports, etc., as listed in the footnote commencing on page 6 of the Special Master's report. To the extent that General Foods' counsel did not receive the Struthers' "privileged" documents (category 6) and the documents in the Struthers prosecution files (category 7) these destroyed documents were and remain unavailable in the present litigation.

Therefore, the Special Master's findings as to the present availability of copies or originals of the destroyed documents will be adopted, modified and rejected to the extent indicated in this section D.

E. Sanctions to be Imposed

The Special Master recommended that no sanctions be imposed upon Struthers

for the destruction of the documents. His recommendation was based upon his findings concerning the matters discussed in sections A through D above, and it was based upon certain other factual findings.

The Special Master found that Struthers' motices for destroying the documents were proper, namely:

1. " . . . when the decision was made by Mr. Drucker on behalf of Struthers in February, 1972 to destroy documents, that decision was in large measure motivated by the existence of a protective order entered in the General Foods litigation or or about April 24, 1969 . . ." [p. 7).

2. "Counsel for Struthers knew that originals or copies of some or all of the documents were in the possession or control of General Foods; they also believed that it would be impossible to reach an agreement with General Foods regarding the disposition of all these documents." (pg. 8).

3. "The proof indicates that Struthers and its counsel were motivated to destroy some of the OSW records because they perceived no need to continue storage, particularly since, in their view, copies or originals of all these documents were on file with the United States government." (p. 8).

4. "As to the files of correspondence and related materials pertaining to Struthers' potential customers in the mid-1960's, Struthers made the decision to destroy these documents because of their age and because of the view of Struthers' counsel, at the time of the destruction, that such documents were wholly irrelevant to any litigation or any other company."

Nestle urges rather substantial'reasons to reject these findings.

As to the finding that the destruction of the documents was occasioned by the existence of the protective order, Nestle notes: (i) Struthers' action constituted a violation of that order, which required that upon termination of the litigation the documents subject thereto be kept "in a secure place", (ii) Struthers' destruction of its own documents could not possibly have been occasioned by the existence of the protective order which was designed to protect General Foods'

documents, and (iii) even as to the depositions of General Foods' personnel and even as to the General Foods' documents, only a portion were subject to the protective order.

As to the finding that counsel for Struthers knew that some or all of the documents were in the possession or control of General Foods, Nestle notes: (i) clearly not all the documents were in the possession or control of General Foods or its counsel (and I have so found in an earlier section of this opinion), and (ii) since Struthers had no discussions with General Foods concerning preservation of documents, Struthers had no basis for relying on General Foods to preserve indefinitely documents which might be relevant in a new litigation to which it was not a party.

As to the finding that Struthers destroyed the OSW documents to avoid the

burdens of storage and because copies or originals were on file with the government, Nestle notes: (i) the so-called "burden" of storing the OSW documents was a $7.50 per month storage bill of Westheimer Transfer & Storage Co., Inc. and (ii) internal Struthers OSW documents would not have been on file with the government (and I have so found in an earlier section of this opinion).

As to the finding that Struthers destroyed its customer records because of their age and lack of relevance, Nestle notes the high degree of relevance of such documents in connection with the on-sale defense. (I have found, in Section C, that it is inconceivable that Struthers' counsel would not have appreciated the significance of this kind of document.)

Were I to make a finding on the evidence which was before the Special

Master as to Struthers' motives in destroying the documents, my finding would differ from his. The reasons Struthers advances smack to me of after-the-fact rationalizations. I note the significance of Struthers' vigorous denials, early in this litigation, that suit against Nestle was contemplated when the documents were destroyed, and the reversal of this position only when confronted in the document destruction proceeding with records which demonstrated conclusively that Struthers and its attorneys were discussing document destruction and suit against Nestle at the very same time. This indicates to me that Struthers knew perfectly well that it should not have destroyed the documents when suit against Nestle was contemplated.

Nevertheless, in some measure this finding rests upon credibility

evaluations, and the Special Master heard certain pertinent testimony on this issue. I conclude, therefore, that the finding as to Struthers' motivation is not clearly erroneous.

Another finding on which the Special Master based his recommendation was that "the instant mofion was filed in December 1975 but not brought on by Nestle for argument and decision by this Court until 1980". This statement is clearly erroneous, but for understandable reasons. The Special Master could not be expected to have a familiarity with the involved procedural history of this case. Nestle brought on the sanctions motion in December, 1975, as the Special Master observed. It was heard and argued before Judge Meanor, who wrote an opinion disposing of that and other motions. He concluded that he could not decide the sanctions motion without an evidential

hearing. Thereafter, the case was assigned to different judges and the delay in scheduling the evidential hearing and resolving the motion was attributable to the inability of the Court to reach the matter, not Nestle's dilatoriness.

The Special Master further found that "not until the spring of 1981 did counsel for Nestle make any effort to obtain existing copies of the documents in question from General Foods or its attorneys".

In October, 1972, Nestle took the deposition of General Foods' Manager of Patent Litigation, Mr. Quillinan, and sought to ascertain the whereabouts of General Foods' copies of all the documentation generated in its case against Struthers. At that time Mr. Quillinan testified, as noted above, that the haystacks of documents had been

redistributed throughout the corporations and "may be in the form of hay". Nestle's attorney then asked if General Foods' counsel had possession of the documents General Foods produced to Struthers. Mr. Quillinan said, "I really don't know." General Foods' patent counsel, who were present, did not disclose that they had in their possession a complete set of such documents. Nestle did not learn of this fact until such counsel were deposed in connection with the proceeding before the Special Master.

Again, I might have reached a different conclusion, but the Special Master's finding that if Nestle really wanted the documents it would have gone after General Foods and its counsel more aggressively, is not clearly erroneous and will be adopted.

The Special Master found that "the

belated motion for sanctions was finally pressed in 1980 more to obtain some tactical advantage over Struthers than to achieve true discovery". I have noted above that the motion was pressed in 1975 and that the five-year delay is attributable to problems which confronted the Court and not to Nestle's inaction. It may well be that Nestle has been primarily interested in the tactical advantages which it could derive from the document destruction caper rather than in the wish to obtain additional discovery, and the Special Master's finding in this regard will be adopted.

On the basis of the findings of the Special Master as adopted, modified and rejected by me, I will adopt his sanctions recommendation, although for somewhat different reasons from those set forth in his report and recommendation.

I do not think there is any basis for

imposing sanctions for violating Judge Lacey's order to produce. Long before he had entered that order Struthers had destroyed the documents. It was unable to comply and, therefore, cannot be held to have willfully violated the order.

The issue is whether Struthers should be penalized for destroying the documents in 1972 under the circumstances of this case.

I conclude that the destruction of the documents was clearly improper. It is immaterial, in arriving at this conclusion, that Struthers thought that the destruction was a convenient way to handle the Delaware district court's protective order or that it sought relief from the burden of storing the documents or that it thought other parties or counsel or the government would have originals or copies of the documents. Similarly, it is immaterial, in arriving

at this conclusion, that Nestle, once having learned of the event, exploited it to the full as a matter of litigation tactics, perhaps thereby seeking to divert the Court from the substantive issues in the case. All that may affect the ultimate relief to be accorded. It does not in any way cure the essential wrongness of what Struthers did.

Struthers had in its possession a vast collection of documents which had been gathered through great effort in an earlier litigation. It was contemplating new litigation involving substantially the same subject matter and issues as were involved in the litigation in which the documents had been assembled. It knew that a substantial portion of the documents would be relevant in the litigation about to be instituted. Yet it nevertheless destroyed those documents. As a result, some became

forever unavailable; many would have to be acquired once again through the long and difficult process of discovery, imposing on the Court and litigants unnecessary, heavy burdens, of which these sanction proceedings are but a part. Regardless of its avowed reasons for the destruction (which the Special Master found to be genuine reasons), Struthers' actions in 1972 were highly improper.

The applicable rule is set forth in Bowmar Instrument Corp. v. Texas Instruments, Inc., 25 Fed.R.Serv. 2d 423, 427 (N.D. Ind. 1977):

> The proper inquiry here is whether defendant, with knowledge that this lawsuit would be filed, wilfully destroyed documents which it knew or should have known would constitute evidence relevant to this case.

Struthers' conduct clearly comes within these criteria. In February and March, 1972 Struthers had in its

possession vast quantities of documents. It was actively planning to institute a complex patent action against Nestle. It knew that the documents included material relevant to the issues which would be involved in that action. Yet, on the eve of filing its complaint, Struthers embarked upon an extensive program to assemble and then destroy these documents, thus placing itself in a position where it could not comply with future discovery requests of the parties or orders of the Court with respect to those documents. It makes no difference what other reasons Struthers had for destroying those documents; its actions in the circumstances which prevailed in 1972 constituted wilfull destruction of documents in anticipation of litigation.

Had this conduct resulted in demonstrable injury to Nestle, there is no question in my mind that whatever

sanctions as would be necessary to undo the harm would be in order, National Hockey League v. Metropolitan Hockey Club, Inc., 427 U.S. 639 (1976). I have concluded, however, in conformity with the recommendation of the Special Master, that Nestle has not been harmed in its defense on the substantive issues in this case.

In Parts II through V of this opinion I set forth my reasons for granting Nestle's motions for summary judgment of invalidity of the ten patents in suit. Even without the destroyed documents Nestle has been able to assemble a comprehensive record with respect to these patents sufficient to demonstrate that there is no genuine issue of material fact as to their invalidity. Access to the destroyed documents might have provided a few more nails to drive into the coffin, but even without those

documents Nestle secured sufficient nails to inter decently the ten patents in suit.

So, in the last analysis, Nestle's ability to meet the substantive issues in the case has not been impaired significantly by the destruction of the documents. The necessity to pursue the matter has imposed a very heavy, unnecessary burden on the litigants and upon the Court. The appointment of the Special Master was required in order to ease the Court's burden and to make it possible for the Court to deal with discovery and substantive matters. Nestle urges that these burdens, which flowed from the document destruction, require that attorneys' fees and other costs incurred by Nestle as a result of the document destruction proceedings be assessed against Struthers. This would be a reasonable sanction in some circumstances. However, in the course of

the present case Nestle's own conduct when discovery was sought from it has been far from exemplary. At every opportunity it sought to delay and obstruct necessary discovery. It evaded and even violated orders of the Court. It, too, has cast unnecessary burdens on the litigants and the Court. Under the circumstances each party should bear its own attorneys' fees and costs incurred in the document destruction proceedings.

An order will be entered which will recite simply that the report and recommendations of the Special Master are adopted, modified and rejected in the manner set forth in this opinion.

II. The Muller Patents

Nestle moved for summary judgment of invalidity and/or unenforceability of Muller patents 3,404,007 (the '007 patent) and 3,495,522 (the '522 patent) on the following grounds:

1. Struthers (Muller's assignee) is collaterally estopped to relitigate the final judgment of unpatentability entered by the Patent Office Board of Appeals in the essentially identical Muller application Serial No. 738,776 (the Muller II application discussed below), from which no appeal was taken.[1]

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1. In support of its collateral estoppel argument Nestle contended that the subject matter of the Muller II application was patentably undistinguishable from the subject matter of the '007 patent. That being the case, Nestle further contended, the final judgment of unpatentability of the Patent Office Board of Appeals collaterally estops Struthers from relitigating the validity of the '007 patent. At the time I rendered my oral opinion, on June 2, (Footnote #1, cont.,) 1981, I was not prepared to rule whether there was a material issue of fact as to whether the differences between the Muller II claims and the '007 claims are merely obvious variations of an invention disclosed in the '007 patent or whether they are of a patentable nature. I held, however, that on equitable grounds it would not be appropriate to apply collateral estoppel effect to the judgment of the Board of Appeals since it was unlikely that Struthers considered

(Footnote #1 cont.,)
itself to be litigating the validity of the '007 patent in the proceeding before the Board of Appeals, Blonder-Tongue Laboratories, Inc. v. University of Illinois Foundation, 402 U.S. 313 (1971). I therefore denied summary judgment on collateral estoppel grounds.

2. The Muller patents are invalid over the prior art, including prior art not considered by the Patent Office before granting the Muller patents in suit.

3. All claims of the '007 patent are invalid for failure to comply with the requirements of 35 U.S.C. § 112.[2]

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2. Nestle contended that the '007 patent fails to comply with the first paragraph of 35 U.S.C. § 112 in that it does not contain a description in such terms as to enable any person skilled in the art to make and use the invention and it does not set forth the best mode contemplated by the inventor of carrying out his invention. Nestle also contended that the '007 patent fails to comply with the requirements of the second paragraph of § 112 in that the claims do not particularly point out and distinctly claim the subject matter which the appicant regards as his invention. In my

(Footnote #2 cont.,)
June 2, 1981 oral opinion I denied the motion for summary judgment on this ground for the reason that these highly technical arguments posed factual questions which I did not wish to resolve without a hearing, cf., Struthers Scientific and International Corp. v. General Foods Corp., 314 F. Supp. 313 (D. Del. 1970).

Upon further reflection and after hearing argument and reviewing the record in connection with the motions for summary judgment as to validity of the remaining eight patents involved in this suit, I have concluded that denial of Nestle's motion on § 112 grounds was correct. However, I believe the proper reason is not that upon which I relied at the conclusion of the argument on the two Muller patents. Rather, the level of skill in the art (freeze concentration and freeze drying of powdered soluble food products) is so high, the § 112 standards Nestle seeks to impose are "unduly parsimonious". I would now find that the '007 patent meets the requirements of § 112. Rengo Co. Ltd. v. Molins Machine Company, Inc., Docket Nos. 80-2556 & 80-2557 (3d Cir. July 20, 1981).

4. (a) The '522 patent is invalid because the apparatus subject matter it claims was abandoned.

(b) The '522 patent is invalid because it claims only an aggregation of

those elements perform only the functions and operations theretofore performed in similar combinations of the prior art.

(c) The '522 patent is invalid for double patenting and extension of the monopoly of the '007 patent.

(d) The '522 patent is invalid by reason of late claiming.[3]

5. The Muller patents are invalid by reason of prior offer for sale, sale and use of the subject matter they claim.

6. The Muller patents are invalid and unenforceable by reason of Struthers' withholding from the Patent Office of information material to the patentability

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3. In my oral opinion of June 2, 1981, I denied Nestle's motion for summary judgment of invalidity and/or unenforceability of the '522 patent on the ground of late claiming.

of the subject matter claimed in the patents.[4]

After the hearing on the Group I motion I reserved decision on grounds 2, 4(a), (b) and (c), and 5. This opinion concerns itself with those grounds.

A. Description of the Patents

1. Muller '007 Patent

The Muller '007 patent is for a "Freeze dried coffee process and product". The abstract of the disclosure recites that "A process is provided for making concentrated coffee or tea in dry form by freeze concentration of an

4. In my June 2, 1981 oral opinion I denied Nestle's motion for summary judgment with respect to the '007 and '522 patents for Struthers' alleged witholding from the Patent Office of information material to the patentability of the subject matter claimed in the patents. I had concluded that facts material to that issue were in dispute. De Long Corp. v. Raymond Intern., Inc., 622 F.2d 1135 (3rd Cir. 1980): Digital Equipment Corp. v. Diamond, 654 F. 2d 701 (1st Cir. 1981)

aqueous beverage extract in which solids are recovered from the ice crystals and the concentrated extract is freeze dried."

The specifications recited that the invention relates to a process for the preparation of powdered soluble food products generally but is particularly applicable to the preparation of powdered or soluble coffee and tea. "Soluble or 'powdered' coffee has been prepared by first extracting coffee beans with hot water and subsequently dehydrating the extract by spray drying under either vacuum or slightly elevated pressure conditions. This process has met with vast commercial success, but the flavor of the soluble coffee leaves much to be desired. Volatile taste and flavor elements of the coffee are lost through evaporation, and more oxidation takes place also because of the elevated temperatures and pressure of air. The

resulting soluble product is, therefore, never as good as the extract from which it is prepared."

The specification noted how this loss of flavor had been dealt with in the past: "To improve the flavor of the soluble coffee, it has been often proposed to remove substantial amounts of the water in the extract by partially freezing the extract and separating the resulting pure ice crystals from the concentrated extract." This constituted a freeze concentration step. There followed a drying step, as to which, the specification noted, "This process of partial freezing is then followed by a complete dehydration under vacuum conditions. In this way the coffee loses less of the volatile components by virtue of the fact that the extract is subject to vacuum conditions for shorter periods of time." But, nevertheless, during the

conventional method of drying the concentrated extract "much of the flavor components of the foffee which are volatile flash off along with the water and must somehow be replaced in the coffee powder. Even this replacement of the coffee aroma elements into the coffee powder produces a product which is not truly comparable to freshly brewed coffee." In essence, the '007 patent solves the problem of loss of flavor by instituting, after the freeze concentration step, a freeze drying step.

The patent has five claims, the first four claiming variants of the freeze concentration-freeze drying process and the fifth claiming the product produced by claim 1. The claims read:

I claim:

1. A process for the preparation of a dehydrated coffee beverage product which is readily soluble in cold

water, said process comprising:

(a) preparing an aqueous coffee extract containing about 10 to 30 percent by weight of dissolved solids;

(b) subjecting said extract to concentration by partial freezing to form ice crystals and a more concentrated extract containing about 30 to about 50 percent by weight of solids;

(c) separating said more concentrated extract from said ice crystals by centrifugation; and

(d) subjecting said more concentrated extract to relatively complete dehydration by freezing the extract to a solid mass and freeze drying to a moisture content of about 1 to 5 percent at temperatures between about 0° to --50C.

2. The process according to claim 1 in which the ice is washed in step (c) and the washings are returned to step (b).

3. The process according to claim 1 in which the ice is washed in step (c) and the washings are returned to step (a).

4. The process according to claim 1 in which the ice is washed in step (c) and thereafter the washings are spray dried.

5. The product produced by the process of claim 1.

2. Muller '522 Patent

The Muller '522 patent is for a "Beverage Apparatus". The abstract of the disclosure reads: "A system of apparatus for dehydrating coffee and tea is disclosed in which a freeze concentration device includes an integral agitator device and an ice separating centrifuge which is connected to a freeze drying device which removes moisture from the freeze concentrated product under vacuum by sublimation and heat." This patent (which was applied for 2-1/2 years after the application of the '007 process-product patent) claims as an invention an apparatus which accomplishes the process claimed in the '007 patent, namely, an apparatus which dehydrates coffee, tea or other powdered soluble food products through freeze concentration followed by freeze drying. Its three claims read as follows:

What is claimed is:

1. A system of apparatus for preparing a dehydrated coffee or tea beverage product from an aqueous liquid, the extract, comprising:

(a) concentrating means for partially freezing the liquid extract to form ice therein by indirect exchange of heat across a tubular heat exchange surface between the extract and a circulating refrigerant;

(b) means coacting with concentrating means (a) for agitating extract and removing ice from said tubular heat exchange surface;

(c) centrifuge means for separating ice formed in the extract from said liquid extract,

(d) freezing means for freezing the extract;

(e) means for removing moisture under vacuum from frozen extract by sublimation; and

(f) heat source means coacting with vacuum means for heating and drying the frozen extract.

2. The apparatus of claim 1 including means coacting with the centrifuge means (c) for washing ice separated from the extract.

3. The apparatus of claim 2 including means coacting with the centrifuge means (c) for recovering solids from washings.

B. Prosecution of the Muller Applications

The history of three pertinent Muller applications for patents, all of which were owned and prosecuted by Struthers, provides indisputable data which bears upon the resolution of the pending motion.

The first application (Muller I; Serial No. 523,574; Ex. 1) resulted in the '007 patent here in suit; the second application (Muller II; Serial No. 738,776; Ex. 2) became abandoned by reason of Struthers' failure to appeal the final Patent Office determination of unpatentability entered by the PTO Board of Appeals; the third application (Muller III; Serial No. 829,613; Ex. 3) resulted in the '522 patent here in suit,

1. The Muller I Application (the '007 Patent)

In January, 1966 Struthers filed the Muller I patent application in the name

of its employee, John G. Muller, for a process of preparing soluble powdered coffee or tea. That process is summarized in the abstract of the disclosure quoted above and appearing in Column 1 of the '007 patent, which issued on that application.

The '007 patent calls for conjoining two processes - freeze concentration and freeze drying. The specification of the '007 patent sets forth one publication and twenty patents which describe "various processes for freeze concentration" (Col. 3, lines 59-68), as well as two publications and twenty-nine patents which describe "freeze drying processes and equipment" (Col. 4, lines 5-17). Yet another publication and eight patents are set forth as describing "various methods of preparing coffee extracts which may be employed in the process of this invention (Col. 2, line

66 to Col. 3, line 4).

The file wrapper of the '007 patent contains the officially certified written record of the proceedings before the Patent Office which resulted in the allowance of the Muller I application and its issuance as the '007 patent.

a. The Petition to Accelerate

After the Muller I application was filed, but prior to any official action by the patent examiner, William Drucker, Esquire, president of the plaintiff and an officer of each counter claim defendant, filed on April 24, 1967 (Ex. 1, p. 20) a request that examination of the application be accelerated, and he concurrently submitted two prior art references, assertedly developed in a search of the prior art. Mr. Drucker represented that the two prior art patents -- neither of which is mentioned in the specification of the '007 patent

-- were "deemed most closely related to the subject matter encompassed by the claims".

The first reference is one of a number of patents to Earl Flosdorf, No. 2,471,677, granted in 1949 (Prior Art Book Tab G). Mr. Drucker distinguished the Flosdorf '677 patent from Muller's alleged invention by asserting that Flosdorf '677

> is limited to the treatment of orange juice, whereas the present invention is concerned with preserving the flavor in coffee and tea.
>
> (Ex. 1, pp. 20-21.)

The petition did not call attention to another of Flosdorf's patents, No. 2,509,681 (Tab H) issued in 1950, even though the application for the latter patent is referred to in Flosdorf '677 (Tab G, Col. 1, lines 9-10). Flosdorf '681 was recognized later in the proceedings to have an important bearing

on patentability of the '007 subject matter.

The other prior art reference cited in the Muller I petition, a 1935 Krause British patent (Tab Q), was acknowledged by Mr. Drucker to relate to freeze concentration of coffee, but he distinguished it as thereafter employing "hot spray [drying] or drum drying". In connection with distinguishing Krause, Mr. Drucker stated the "essence" of Muller's invention:

> It is the essence of the present invention to start with a suitable concentrate, as does Krause, but thereafter to subject it only to a cold desication [sic] so as to avoid the volatilization of delicate flavor substances which would be lost in spray or drum drying * * *
>
> (Ex. 1, p. 21.)
>
> Thus, none of the "most closely related" art which Struthers brought to the examiner's attention described freeze concentration of coffee followed by freeze drying.

b. The Examiner's First Action

Shortly after the petition was filed, a first official action, dated June 6, 1967, was mailed to Mr. Drucker by the patent examiner, Maurice W. Greenstein (Ex. 1, p. 28). See 37 C.F.R. §§ 104-107. The examiner had found the Flosdorf '681 patent, and with one exception, which is not pertinent for present purposes, he rejected all of the Muller application claims "as fully met by" that patent.

The 1950 Flosdorf '681 patent describes freeze drying of fruit juices and aqueous extracts "such as coffee extract" (e.g., Tab H, Col. 1, line 3; Col. 2, line 3; Col. 8, lines 4 and 9). Flosdorf teaches that the juice or extract should be "preconcentrated" by appropriate means before freezing and freeze drying, as by

> subjecting the material to partial freezing with formation of a mixture of ice and concentrate and separating the concentrate from the ice, as by centrifuging.

(Tab H, Col. 2, lines 17-20.)

The quoted teaching describes freeze concentration. The '007 patent uses like terminology; see Col. 2, lines 1-6.

Flosdorf '681 thus expressly teaches the conjoined processes of freeze concentration followed by freeze drying of coffee extract. Flosdorf '681 also teaches freeze concentrating coffee extract to within the range (30% to 50% solids) set forth in the Muller '007 patent claims:

> With coffee extracts, preconcentration to a solids content of about 50% gives optimum results in the practice of the invention, from the standpoint of quality of product and cost.
>
> (Tab H, Col. 8, lines 9-12.)

The examiner rejected the Muller claims as having been anticipated by

Flosdorf, relying on 35 U.S.C. § 102(b).

The examiner's first action also made a separate and additional rejection of all the application claims over other art, viz., the 1942 Irwin patent 2,292,447 (Tab D) or the 1956 Colton patent 2,751,687 (Tab J), in view of the 1947 Noyes patent 2,416,945 (Tab F) and (as to tea) the 1958 Cortez patent 2,852,388 (Tab K). Irwin and Colton, the primary references in this rejection, were cited as showing preparation of soluble coffee by freeze drying coffee extract, which can be preconcentrated by any conventional method. Noyes was cited to show that freeze concentration is one of those conventional methods. The examiner stated:

> Consequently, to concentrate the extracts of the primary reference[s] as by the method of Noyes is deemed to be an obvious expedient and well within the purview of one having

ordinary skill in this art.

(Ex. 1, p. 29.)

Struthers responded to the official action and requested reexamination (see 37 C.F.R. § 1.111). In its response, filed August 21, 1967 (Ex. 1, p. 31), Struthers did not challenge any of Examiner Greenstein's rejections. Faced with the rejection on Flosdorf '681, and the separate rejection on Irwin, et al., Struthers cancelled the principal original claims and substituted new claims 7-10. The differences between the original claims and the new claims appear from a side-by-side comparison set forth in Appendix A, in which there are also set forth the claims which eventually issued in the '007 patent.

As appears from the comparison, one change effected by the amendment was to add a limitation in clause (c) of application claim 7 that after separating

the ice from the concentrated solution, coffee solids be recovered from the ice to be combined with the more concentrated extract.[5]

That new limitation was asserted by Struthers to constitute the significant advance which "clearly distinguishes over the cited art" -- even though it is not part of the "essence of the invention" previously urged upon the examiner by Mr. Drucker.

Mr. Drucker's remarks accompanying the new claims asserted:

> The feature of this claim [new claim 7] which most clearly distinguishes over the cited art is found in step (c) in which the solids are recovered from the ice after cintrifugation of the ice from a concentrated extract prior to freeze drying theconcentrated extract. * * * None of these principal references [Flosdorf, Irwin or Colton] teach the recovery of solids from the ice subsequent to centrifugation.

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5. Dependent claims 8-10 specify that the recovery of solids is by washing the ice.

(Ex. 1, p. 33.)

> Muller's invention was thereby recast, and patentability over the prior art was posited by Struthers upon the feature of recovering solids from the centrifuged ice.

c. The Examiner's Second Action

In response to Struthers' new claims the examiner mailed a further official action, dated March 26, 1968, to Mr. Drucker (Ex, 1, p. 34). Examiner Greenstein cited additional prior art showing the allegedly distinguishing feature of solids recovery from the ice to be old and well known.

The 1961 Cole patent 2,967,778 (Tab M) cited by the examiner describes freeze concentration of juices "and other beverage liquids such as milk, coffee, etc." (Col. 1, lines 24-25), Cole teaches that some of the concentrate clings to the ice crystals in the centrifuge too tightly to be removed by centrifugal force, and that enough liquid containing

valuable solids clings to the ice to require removal and recovery. That removal is accomplished by treating the ice in the centrifuge with controlled amounts of water (Tab M, Col. 5, lines 38-50), a procedure the patent refers to as a "washing procedure" or "washing treatment" (Col. 6, line 18; Col. 8, lines 54-56). The washings are returned to any desired stage of the process.

The examiner also cited a 1940 Basset British patent 529,202 (Tab R), which also discloses freeze concentration of coffee extract and washing retained solids from the ice in the basket of the centrifugal "hydro-extractor", i.e., centrifuge (page 2, lines 1-7).

As Examiner Greenstein put it:

> Flosdorf teaches partially dehydrating coffee extract by freeze concentration to a solids level within the range set forth herein. The concentrate is then frozen and its moisture sublimed as claimed. The newly defined procedures of the instant claims

differ from those of Flosdorf in the additional steps of washing the centrifuged ice crystals to recover coffee solids imprisoned by the water ice and adding said recovered solids to various phases of the drying procedure. However, such steps, which are set forth for the first time, are considered to be an obvious expedient where one wishes to recover all of the flavor components of the original extract. Furthermore, those steps are deemed to be obvious because they are conventionally employed in the coffee art, as shown by the secondary references.

The examiner added that the prior art also rendered the tea claim unpatentable.

The second action was made FINAL (see 37 C.F.R. § 1.113), giving Struthers the right to appeal from the examiner's action to the Board of Appeals. Struthers did not appeal or file a written response to the second examiner's action. Instead, Mr. Drucker had an interview with Examiner Greenstein.

d. The Interview with the Examiner

There is no written record which summarizes or other wise reveals the discussion that was had during the ex

parte interview between Mr. Drucker and Examiner Greenstein. The form letter mailed April 25, 1968 (Ex. 1, p. 37) states that the interview occurred on April 23, and the paper mailed April 30, 1968 (Ex. 1, p. 38) states that "agreement was reached" at the interview to the changes it sets forth. The reasons advanced by Mr. Drucker, which caused the examiner to withdraw his rejections, do not appear in the official file wrapper.

As is seen from the comparison chart (Appendix A), application claim 7 (which became claim 1 of the '007 patent) was amended to cancel the very feature -- recovery of solids from the ice subsequent to centrifugation -- upon which Mr. Drucker had previously posited patentability of that claim over the prior art cited in the first rejection.

Other changes were also made[6], and application claims 7-10 were allowed. They appear as claims 1-4 of the '007 patent.

The Patent Office record does not disclose how application claim 7 (patent claim 1), after amendment to eliminate

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6. The preamble of patent claim 1 recites that its process produces dehydrated coffee which is readily soluble in cold water. That, however, is merely an intrinsic characteristic of freeze dried coffee, which is inherently highly porous, as pointed out in the Irwin patent (p.2, right col., lines 26-32, Tab D). Amending the claim to recite a known and intrinsic characteristic of the product does nothing to render patentable the process to which the claim is directed. So also, the amendment of clause (d) to recite a suitable range of moisture content in the dehydrated product does not impart patentability, see Application of Clinton, et al., 527 F.2d 1226, 1229 (CCPA 1976), particularly as Muller's own specification states that drying to such a moisture content is "generally" employed in the prior art (007 patent, Col. 4, lines 26-27). Further, it would appear that the precise moisture content added to clause (d) -- about 1 to 5 per cent -- was set forth in the 1963 Sivetz text on Coffee Processing Technology, Vol. 2, pages 102, 103.

the solids recovery feature, could have been regarded as patentable over the art cited in the first action. In that action, as described above, the examiner had rejected the claims "as fully met by Flosdorf", and had additionally rejected them as unpatent able over Irwin or Colton in view of Noyes. These were rejections Struthers did not challenge but, instead, sought to avoid by presenting new claims including the solids recovery feature. Application claims 8-10 (patent claims 2-4) recite washing the ice, but that feature was established by the examiner in the second action to be only an obvious variant shown in the Cole and Basset patents he cited.

The file wrapper does not suggest why the examiner reversed his previous positions. The record also lacks and statement of the reasons advanced by Mr.

Drucker in support of his oral request at the interview for reconsideration of the final rejection of the claims.

The absence of a written record violated Patent Office rules, see, e.g., 37 C.F.R. §§ 1.2, 1.111, 1.133. The official action of the examiner issued after the interview did not, as Struthers contends, constitute compliance with these rules. The consequences which should flow from these violations will be discussed in later sections of this opinion.

In addition to the changes in the claims referred to above, there appeared in the '007 patent allowed by the examiner after his interview with Mr. Drucker claim 5 -- the product-by-process claim. Struthers had made no written request for that type of claim. Patent Office regulations in effect at the time, as set forth in the Manual of Patent

Examining Procedure, permitted that form of claim only in certain circumstances, and only if the applicant submitted a required showing. Thus, § 706.03(e) of the Manual provided:

> An article which cannot be described in any other manner, may be claimed by a process of making it * * *. Applicant must, however, make a showing that the product cannot be described except by reference to the precess of making it. (Emphasis supplied.)

No such showing appears in the file wrapper of the '007 patent, notwithstanding the Patent Office requirement that all business be transacted in writing. Nor is it shown how Mr. Drucker persuaded the examiner to grant such a claim which had not been requested in writing.[7]

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7. After issuance of the '007 patent Struthers, proceeding under 35 U.S.C. § 255, twice sought and obtained the correction of errors allegedly of a clerical or typographical nature. First,

(Footnote #7 cont.,)
the "--50°C" temperature appearing in the last line of claim 1 was changed to read "--45°". Second, the pressures used during freeze drying, which originally read "from 250 mm. of Hg to 200 mm. of Hg", were changed to read "from .250 mm. of Hg to .200 mm. of Hg". It is Nestle's contention that Struthers failed to comply with statutory and regulatory requirements when it obtained these amendments. It is unnecessary to decide that issue for the purposes of the pending motions.

2. The Muller II Application

In June, 1968, after the Muller I application had been allowed, Struthers filed the Muller II application (Serial. No. 738,776; Ex. 2). The Muller II specification is essentially identical to that of the Muller I application as filed, except that it contains the "up to about 50 percent" disclosure at page 6, line 21 (Ex. 2, p. 9) which was not contained in Muller I as filed. Original claim 1 of the Muller II application largely paralleled the original claim of the Muller I

application, but was directed to vegtable product extracts. There were dependent claims to coffee and tea, and there was also a product-by-process claim (Ex. 2, p. 13).

Struthers sued General Foods under the '007 patent on October 1, 1968, the day it issued. During the course of discovery in that action it became apparent that there might be ambiguity in the '007 patent as to the freeze drying temperature set forth at the end of claim 1. Insofar as this ambiguity persisted in the Muller II applocation it was cured by an April 24, 1969 amendment which added a new claim 11. New claim 11 (Ex, 2, p. 19) was specific to coffee and paralleled claim 1 of the '007 patent, with three differences. In clause (b), the more concentrated extract is recited in claim 11 to have a concentration of at least 30% solids, whereas patent claim 1

recites about 30% to 50% solids. In clause (c), claim 11 includes washing the extract in a centrifuge; this is the subject matter shown by the Cole and Basset patents cited by the examiner in his second action in Muller I. Third, clause (d) of claim 11 was rewritten to make plain that the temperature range applies to freezing of the extract:

> (d) Subjecting said separated more concentrated extract to further dehydration by: freezing at temperatures between about 0° and minus 45° C; sublimation of ice; and further drying under vacuum to a moisture content of 1 to 5% by weight.

New claim 11 thus repaired the deficiency of '007 claim 1, to which General Foods had drawn attention.

a. The Examiner's First Action

In December, 1969, Examiner Greenstein mailed to Mr. Drucker a first official action in the Muller II application. The examiner took exception

to designation of Muller II as a "divisional" application. By statute, 35 U.S.C. § 121, a divisional application is one filed as a result of a requirement for restriction (also known as a requirement for division) between independent and distinct inventions claimed in a prior application. See also 37 C.F.R. § 1.142. In the event two distinct inventions are initially claimed in an application and the Patent Office requires restriction between them, the applicant must elect which one he wishes to prosecute in that application. The other invention may be made the subject of a divisional application. § 121 provides that in the event of such a requirement for restriction, the patent issuing on either application cannot be used as a reference against the other.

Examiner Greenstein pointed out that there had been no requirement for

division in the Muller I application, and it was consequently improper to style Muller II as a "divisional" application. The examiner demanded a new oath, and correction of the specification (Ex. 2, p. 23). In response, Mr. Drucker acquiesced and promised to supply a new oath upon indication that Muller contained allowable (patentable) subject matter (Ex. 2, p. 29).

The examiner's first action rejected claim 11 (and dependent claims 12-14) of the Muller II application as unpatentable over claims 1 to 4 of the '007 patent. The rejection was based on the 35 U.S.C. § 101 prohibition against double patenting.

All claims in Muller II (claims 1-14) were also rejected over the counts of two interferences in which the '007 patent was then involved. Both interferences were terminated, without award of

priority, before conclusion of proceedings in the Muller II application, and they consequently had no effect on the outcome.

Product-by-process claim 2 of the Muller II application was rejected as unpatentable over the freeze dried coffee shown by the Irwin reference (Tab D). The examiner stated (Ex. 2, p. 23):

> At best there is but a difference in degree and not of kind between the instantly claimed product and that of the reference. The product is, in any event a freeze dried coffee, used in the same manner as any other freeze dried coffee product.

b. The Product-by-Process Claim

Struthers initially contested Examiner Greenstein's rejection of the product-by-process claim by pointing to the allowance of that form of claim as claim 5 of the '007 patent (Ex. 2, p. 29). In the next action, however, a

different examiner (Mr. Bashore) repeated the rejection, saying (Ex. 2, p. 32):

> Claim 2 is rejected as an improper product-by-process claim. The freeze dried product may be described in other manners without the necessity of relying on a description of the process by which it is made.

Struthers thereafter did not make a showing in support of that form of claim but, rather, acquiesced in the rejection by cancelling claim 2 (Ex. 2, p. 40).

c. The Double Patenting Rejection

In response to the double patenting rejection made in the first action, Mr. Drucker inquired as to the possibility of overcoming that rejection by filing a terminal disclaimer (Ex. 2, p. 29). Examiner Bashore replied in the second official action that a terminal disclaimer would not overcome that rejection (Ex. 2, p. 32). Nonetheless,

in March, 1972 a terminal disclaimer was filed; it was signed by Mr. Drucker in his capacity as Vice President of Struthers Scientific (Ex. 2, p. 21). That instrument disclaimed the terminal portion of any patent granted on the Muller II application which would extend beyond the expiration date of the '007 patent. By filing the terminal disclaimer Mr. Drucker conceded that the terms of the Muller II application were not patentably distinct from the subject matter patented in the '007 patent, Application of Vogel, 422 F.2d 438 (CCPA 1970); Manual of Patent Examining Procedure § 804.

d. The Prior Art Rejection

In the second official action all claims in the Muller II application were rejected over prior art (Ex. 2, p. 33). The rejection was based upon Struthers' own Ganiaris patent 3,283,522 (Tab O) in

view of the 1942 Irwin patent (Tab D) which had been cited in the Muller I case. The Ganiaris patent was cited as teaching freeze concentration of tea and coffee extracts, as well as washing of the separated ice. Irwin was cited to show vacuum drying of coffee extract by sublimation (freeze drying). Another reference (Togashi) was cited against a tea claim, which was later cancelled.

The second action was made FINAL, and Struthers there upon appealed to the Patent Office Board of Appeals (Ex. 2, p. 36).

e. Muller II - The Decision of the Board of Appeals

The decision of the Board of Appeals was rendered January 12, 1973 (Ex. 2, p. 78). As to the double patenting rejection the Board took note of the recent decision in Application of Vogel, 422 F.2d 438 (CCPA 1970), which required

identity of subject matter claimed in a prior patent and a later application in order to meet the "same invention" test (i.e., the situation which cannot be overcome by the filing of a terminal disclaimer). The Board stated:

> In the instant case, the appealed claims set forth a process which is almost exactly the same as the claims of U.S. 3,404,707 [sic: 3,404,007, the Muller patent cited on the previous page of the Board's decision]. Even though the differences between the appealed claims and the patent claims are so small as to be almost non-existent, the fact remains that the claims are not drawn to identical subject matter. Under the identity of subject matter tests required by the CCPA, we cannot sustain the examiner's rejection.

The Board then went on to affirm the rejection of all claims remaining in the application as being unpatentable over the combination of the Ganiaris '522

patent and the Irwin '447 patent.[8] After discussing the disclosures of the two references, the Board stated:

> In summary, Irwin shows the freeze drying of coffee extract and indicates that concentration of the brew is preferable prior to dehydration. Ganiaris shows a concentration procedure useful prior to preparation of an instant coffee. It is our opinion that the use of the Ganiaris concentration procedure in combination with the Irwin dehydration method would be clearly obvious to the skilled worker in the art.
>
> Contrary to the appellant's assertion, there is a clear link between the combination of references cited by the Examiner. Even though Ganiaris shows no drying step, it is clearly suggested that the concentration of the extract is preliminary to the preparation of instant coffee. Instant coffee may be prepared by the method of Irwin,

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8. The Board did not have before it a rejection based on the Flosdorf '681 patent, over which all claims of the Muller I application had been rejected by Examiner Greenstein under § 102. Examiner Bashore had not cited that patent in his prior art rejection in Muller II, and Mr. Drucker had not brought it to the attention of the Examiner.

> and, as pointed out above, concentration prior to drying is Irwin's preferred embodiment. Washing of the ice crystals in the centrifuge is shown in Ganiaris' Figure 2. These washings are recirculated into the system and will be ultimately dried along with coffee extract when the dry coffee is produced. Irwin shows the same dehydration procedure as used in the appealed claims, i.e., freeze drying. No particular temperatures are recited for the freezing of coffee extract. However, it is clear that temperatures sufficient to freeze the material must be used. Determination of the proper temperature would be merely routine experimentation which is within ordinary skill in the art.
>
> (Ex. 2, pages 81-82.)

Struthers elected not to exercise its right of appeal either to the CCPA under 35 U.S.C. § 141 or to the United States District Court under 35 U.S.C. § 145, and, instead, permitted the Board's adverse judgment to become final. 37 C.F.R. § 1.197 (c)

3. The Muller III Application (the '522 Patent)

The Muller III application (Serial No. 829,613; Ex. 3) was filed June 2, 1969, well subsequent to issuance of the '007 patent and some 3-1/2 years after the Muller I application was filed. The Muller III specification is essentially similar to that of the Muller II case. In Muller III Struthers, for the first time, presented claims to apparatus.

Both the oath (Ex. 3, p. 15) and the specification (Ex. 3, p. 5) of Muller III represented that application to be a "division" of Muller II; they also represented Muller II to have been a "division" of Muller I. See ante, page 55-56. Muller I and Muller II were examined in Patent Office Art Group 170; Muller III was examined in a different art group, Group 360. Struthers did not inform the Muller III examiner (Mr.

Jenkins) that there had been no requirement for division in either Muller I or Muller II, and Mr. Jenkins did not cite the '007 patent against the Muller III apparatus claims.

The notice of allowance of Muller III (Ex. 3, p. 26) and Examiner Greenstein's action in Muller II objecting to designation of that application as a division (Ex. 2, p. 22) were both mailed the same day, December 12, 1969. Struthers did not bring to Examiner Jenkins' attention in Muller III the objection advanced by Examiner Greenstein in Muller II to designation of the latter as a divisional application. Struthers paid the issue fee for Muller III on December 16, 1969 (Ex. 3, p. 27) and concurrently requested that the patent issue on the earliest possible date (Ex. 3, p. 28).

The apparatus claims of Muller III

are in "means" form; that is, each of the several clauses recites means for performing a stated function. The claims were allowed as filed, with only minor changes effected by an examiner's amendment mailed November 4, 1969 (Ex. 3, p. 17). The examiner cited a number of items of prior art (Ex. 3, p. 19) which he said had been considered (the Muller '007 patent is not among those listed).

Muller III issued as the '522 patent on February 17, 1970 (Ex. 3, p. 21).

C. The CCPA Clinton Decision

While Struthers pursued the Muller applications, General Foods sought to patent essentially the same freeze con centration/freeze dry subject matter in its Clinton, et al patent application.[9]

9. The General Foods' Clinton, et al. appliocation additionally claimed "dewaxing", a topic considered in connection with the Struthers' Reimus patents.

The Clinton, et al. application (Serial No. 830,195) had been involved in interference with the Muller '007 patent, and Clinton, et al. had been accorded benefit of the May 5, 1965 filing date of their parent application (Ex. 1, p. 65). That interference was terminated in April, 1972, after settlement of all litigated matters between Struthers and General Foods in February, 1972 (Ex. 2, p. 57). Thereafter, General Foods sought to obtain patent claims to freeze concentration and freeze drying of coffee extract.

As Clinton's May 5, 1965 effective filing date was earlier than Muller's January 28, 1966 filing date, the Muller patent was not prior art as against Clinton, et al.

The essential identity of the subject matter Clinton sought to patent and the

subject matter patented to Muller is shown by the following side-by-side comparison of their two principal claims (the text of the Clinton claim appears in the CCPA opinion):

Muller '007 Claim 1	Clinton Claim 1
1. A process for the preparation of a dehydrated coffee beverage product which is readily soluble in cold water, said process comprising:	1. A process for preparing a granular freeze-dried coffee having a dark color, which comprises
(a) preparing an aqueous coffee extract containing about 10 to 30 percent by weight of disolved solids;	percolating roasted and ground coffee to obtain a coffee extract containing 20-35% soluble solids and desired flavor and aroma values,
(b) subjecting said extract to concentration by partial freezing to form ice crystals and a more concentrated extract containing about 30 to about 50 percent by weight of solids;	freeze-concentrating said extract to a solids level of 35-53% by partially freezing the water in said extract as ice crystals and
(c) separating said	removing said

more concentrated extract from said ice crystals by centrifugation; and

ice crystals from the concentrated extract,

(d) subjecting said more concentrated extract to a relatively complete dehydration by freezing the extract to a solid mass and freeze drying to a moisture content of about 1 to 5 percent at temperatures between about 0° to --45°C.

cooling said concentrated extract to below its eutectic point, grinding the frozen extract to a granular particle size, and then freeze-drying said granular frozen extract to between 1 and 2.5% moisture under vacuum conditions of less than 500 microns while maintaining the product temperature of said coffee below 120°F.

Pursuant to 35 U.S.C. §141, General Foods appealed to the United States Court of Customs and Patent Appeals from the examiner's final rejection of the Clinton claims, which the Board of Appeals had affirmed. That Court, in turn, affirmed. Application of Clinton, et

al., 527 F.2d 1226 (CCPA 1976).

As the Court's opinion reflects, the Clinton, et al. claims were rejected over the Flosdorf '681 patent (Tab H) considered with the Colton '687 patent (Tab J) and Sivetz (Tab U); alternatively, the claims were rejected over Clinton, et al. '784 (Tab P) considered with the Ganiaris '522 patent (Tab O) (527 F.2d at 1228). The Court summarized each of the prior art references, but in the portion of the decision headed "OPINION" the Court rested its affirmance of the rejection on Flosdorf '681 alone (with reference to a Cottle patent as to the dewaxing claims). The Court stated:

> We first consider the references by themselves and see whether they suggest doing what appellants have done. [Citation omitted.] Flosdorf alone suggests subjecting a coffee extract to a combination of freeze concentration and freeze drying.

(527 F.2d at 1228.)

The Court of Customs and Patent Appeals thus affirmed the rejection of claims to freeze concentration and freeze drying of coffee over the same Flosdorf '681 patent which Examiner Greenstein originally had regarded as a complete anticipation of Muller's claims im the Muller I application (which became the '007 patent). As noted above, the Muller I file wrapper does not give the slightest hint why the examiner abandoned that position.

D. Prior Sale - Nestle's and Struthers' Contentions

Nestle urges as an additional ground for its motion for summary judgment of invalidity of the '007 and '522 patents the prior offer for sale, sale and use of the subject matter those patents claim.

1. Facts Relied upon by Nestle

Nestle relies upon data Struthers

supplied in response to discovery requests in the General Foods case and in the present case to establish that the subject matter of the '007 and '522 patents was in public use or on sale in this country more than one year prior to the date of application of those patents and that, therefore, the two patents are invalid under 35 U.S.C. § 102(b). The material upon which Nestle relies is as follows:

Struthers published a five-page advertising brochure captioned STRUTHERS "FRECON" PROCESS QUESTIONS AND ANSWERS, bearing a revision date of 11/27/64 (Item 7 in Struthers Production Book), which is more than one year prior to the filing date of Muller I. "FreCon" is Struthers' acronym for freeze concentration. That advertising brochure included the following statements (all emphasis is supplied):

5. Q. What products have been successfully concentrated by the "FreCon" process?

A. To date, the following products have been successfully concentrated by the "FreCon" process:

Coffee Extract

It is thought that virtually all comestible liquids could be successfully concentrated by the "Fre Con" feeeze concentration technique.

7. Q. What is the difference between freeze concentration and freeze drying?
A. * * * Freeze concentration is far less expensive than freeze drying per pound of water removed. Thus, where it is desired to reduce a liquid to a dried product, it is more economical to install a freeze concentration plant as the first step followed by freeze drying.

* * *

11. Is the Struthers "FreCon" process really perfected yet?

A. Yes. Struthers is now prepared to supply complete "FreCon" plants of any size on a firm price-guaranteed performance basis.

12. Q. What does the "FreCon"

process cost?

A. * * * Recent proposals on Struthers' "FreCon" plants to concentrate coffee extract to 45% solids from 25% solids shows an overall cost of $.03 per pound of dry coffee solids.

* * *

14. Q. Is it possible to rent a pilot plant so that client can evaluate the "FreCon" process in his own plant on fresh material using his own operating staff?

A. Yes. Struthers is prepared to rent for use in the client's own plant a portable freeze concentration unit capable of producing 100-150 pounds per hour of 40-50 Brix concentrate from fresh whole juice. This unit, complete with all auxilliaries, including an ammonia refrigeration system, is presently mounted on a railroad flat car. If necessary, it can be transferred to a truck trailer.

On the basis of this brochure Nestle argues that the subject matter claimed in the Muller patents was on sale more than one year prior to the filing of the Muller I application.

In addition, Nestle urges that the

subject matter of the Muller patents was sold by Struthers to General Foods more than one year prior to the January, 1966 Muller I application, and General Foods used and practiced that subject matter. Nestle refers to Struthers' supplemental answer to Nestle's interrogatory 50:

> 50. Respondents believe that General Foods Corporation has infringed United States Letters Patent Nos. * * * 3,404,007, * * * 3,495,522 * * *. The basis of such belief lies in the fact that Struthers Scientific and International Corporation in 1964 and 1965 sold freeze concentration equipment and systems to General Foods for use in freeze concentrating coffee extract and General Foods did in fact freeze concentrate coffee extract with said equipment. * * *

A copy of the 1964 contract between Struthers and General Foods is Item 8 to the Struthers Production Book, and copy of the 1965 contract is Item 9.

Even earlier, in September, 1963, Theodore Feit of Struthers caused an article to be published in Food

Engineering News entitled, "Struthers Scientific Introduces Freeze Concentration Process" (Item 10). The publication stated Struthers had developed "a new process for concentrating comestible liquid products by freezing", including such products as fruit and vegetable juices, soups, coffee and other beverages, and that:

> Several leading food processors are currently evaluating the process for use on a commercial scale, and Struthers is offering the process, called the Struthers 'FreCon method' under license to a single processor in each field.
>
> (Item 10, page 1.) (Emphasis supplied.)

In 1964, as part of its effort to sell its freeze concentration system and equipment, Struthers made numerous contacts with major food processors. Initially, Struthers' sales department "took a rifle approach" by contacting specific companies. Shortly thereafter,

Struthers Vice President in charge of the "FreCon" division, John G. Muller, stepped in and made "a number of blanket mailings" to food companies describing the "FreCon" process and equipment, and enclosing brochures (Muller Tr. 961-962; Defendant's Deposition Ex. 16, Tab 8).

At a meeting of December 30, 1963, Struthers offered to supply to the Birds Eye Division of General Foods a "FreCon" plant at a cost of between $325,000 and $350,000, and also discussed rental of a portable "FreCon" plant mounted on a railroad flatcar (Item 11). Design drawings of the "FreCon" system for the flatcar unit were also shown to General Foods at the meeting.

In January, 1964, Struthers began assembling the portable "FreCon" plant and completed construction early in 1964 (Muller Tr. 794; Defendant's Deposition Ex. 16, Tab 8). That portable unit had

freeze concentration equipment mounted on a 60-foot railroad flatcar containing crystallizers, centrifuges, pumps, tanks, and miscellaneous equipment to practice Struthers' process of freeze concentrating comestible liquids (Muller Tr. 819; Item 1). Muller testified to the purpose for constructing the flatcar plant:

> Q. Could you tell me in your own words what the purpose of this plant was?
>
> A. Our sales engineer had been in contact with the Birds Eye Division of General Foods endeavoring to sell plants for the freeze concentration of orange juice.
>
> He had the impression, he told me that if we had a plant of some appreciable size that had been shown to operate satisfactorily on orange juice, then we would receive orders for a commercial plant.
>
> Our Board of Directors appropriated the funds to build the mobile plant to demonstrate the suitability of the process to Birds Eye and also to others.

That was the original justification for building it.

(Muller Tr. 959-60; Defendant's Deposition Ex. 16, Tab 8.)

In February, 1964, Struthers and General Foods reached agreement concerning use of the flatcar "FreCon" plant at the Birds Eye facility in Winter Haven, Florida. Despite an initial demand for a $12,000 per month rental fee (Item 11), Struthers agreed, in furtherance of its efforts to receive orders for a commercial plant, to allow General Foods to use the flatcar at Winter Haven free of charge (Item 16). Struthers made another sales concession to General Foods in agreeing to a non-confidential agreement covering the use of the flatcar at Winter Haven (Item 16, pages 1-2.)

At the same time Struthers was building its flatcar "FreCon" plant, Struthers' sales manager, J. J. Pike,

made a firm offer to sell a "FreCon" plant to General Foods' coffee arm, the Maxwell House Division.' On January 9 and 16, 1964, Pike wrote to General Foods enclosing a detailed contract proposal and process flow diagrams of Struthers' "FreCon" plant (Items 13 and 14). Pike wrote:

> In accordance with our meeting in your office on January 13, 1964, we are pleased to submit herewith our firm proposal for a plant to concentrate coffee extract from 27% by weight coffee solids to 45% by weight coffee solids via the Struthers Scientific and International Corporation freeze concentration (FreCon) process. This plant would process approximately 1,500 pounds per hour of feed and produce approximately 900 pounds per hour of 45% extract containing 400 pounds of coffee solids.
>
> (Item 14.)

This offer for sale of the "FreCon" equipment and process was for a commercial size plant. If operated continuously, the plant would process

over three million pounds of coffee solids per year. The commercial processing capacity of the "FreCon" plant was fully recognized by the parties and recited by Struthers in its offer:

> As we have discussed, this system would be supplied to the Maxwell House Division with the understanding it will be used as pilot plant facilities or possibly for use in market testing of your product. In the event you utilize this equipment in the production of a Maxwell House product to be nationally distributed, a paid-up royalty of $10,000 would be required.
>
> (Item 14.)

The General Foods' product referred to in Pike's letter was MAXIM, a freeze dried soluble coffee General Foods had recently introduced. Struthers had promoted its FreCon system for use with freeze drying, and Struthers was aware that General Foods intended to use the Struthers freeze concentration equipment in the manufacture of freeze dried MAXIM soluble

coffee (Item 15).

On April 30, 1964, in order to "expedite the project", General Foods' Maxwell House Division accepted Struthers' offer of January, 1964:

> As you know, we are now engaged in the preparation of a definitive agreement for purchase from you of the 'FreCon' equipment and process and we hope to be in a position to submit the documents to you shortly.
>
> (Item 12.)

Further to "expedite" the project, Struthers was at the time authorized to order necessary equipment and to begin necessary work, even though the formal contract of sale had not yet been executed (Item 12).

Meanwhile, the completed flatcar "FreCon" plant was sent to General Foods' Winter Haven facility. It arrived during April, 1964 and was used there for

several weeks, first to concentrate orange juice and then coffee extract (Muller Tr. 798, Item 1). Photographs of the flatcar were taken at Winter Haven (Muller Tr. 279-305, Item 1), and the flatcar plant was shown by General Foods to personnel from the Florida Citrus Commission (Muller Tr. 313-314, Defendant's Deposition Ex. 16, Tab 8).

By May 21, 1964, Birds Eye had completed its use of the flatcar "FreCon" plant for concentrating orange juice and turned over the equipment to Maxwell House Division personnel for freeze concentrating coffee extract (Item 17). Coffee extract was shipped from a nearby General Foods' facility and personnel from General Foods' Hoboken coffee manufacturing plant were present during the freeze concentration runs using coffee extract. Near the end of May, 1964 General Foods completed its

evaluation of the "FreCon" system and returned the unit to Struthers.

Arrangements were made for Maxwell House to make further use of the "FreCon" plant and on about August 10, 1964 the flatcar arrived at the Hoboken coffee plant. Coffee extract was freeze concentrated in the flatcar unit from a 24% to 26% initial concentration to a 43% to 45% final concentration (Item 19). That use ended and the flatcar "FreCon" plant was removed from Hoboken in September, 1964.

Negotiations for the formal contract of sale continued during the spring and summer of 1964, and on August 12, 1964, Struthers and General Foods entered a "Contract of Sale for Freeze Concentration Equipment" (Item 8). The contract provided:

> Struthers shall sell to General Foods, and General Foods shall

> purchase from Struthers, the freeze concentrating equipment enumerated and described in the attached specifications marked 'Exhibit A' for the price, upon the terms of payment, and subject to the terms and conditions hereinafter stated.
>
> (Item 8, p. 1)

The equipment contracted for was actually delivered to General Foods' Hoboken plant during November and December, 1964. It included means for washing ice in the centrifuge (Struthers Answer to General Foods' Interrogatory 119; Item 21). General Foods' commercial use of the equipment sold under the first contract is also confirmed by a reconciliation of charges included in a second contract of September 30, 1965 (Item 9). The reconciliation states: "Prepaid royalty for commercial use of plant -- $10,000."

2. Facts Relied upon by Struthers

Struthers correctly notes that under § 102(b) any sales or offers for sale of

the inventions claimed in the '007 and '522 patents within one year prior to January 28, 1966, (the date of filing of Muller I application) would not invalidate that patent. (The '522 patent, Muller III, has the same effective filing date as Muller I.) Thus, references to sales, offers to or use of those inventions in 1964 and 1965 are not sufficient to establish § 102(b) invalidity, since all but the first twenty-eight days of 1965 are within the one-year period exempted under § 102(b).

Struthers contends that not only has Nestle failed to establish a sale, offer to sell, or use within the one-year period, it has failed to establish that what was sold to General Foods was, in fact, the invention claimed in the '007 and '522 patents.

Referring to Struthers' supplemental answer to Nestle Interrogatory 50, which

is quoted above, Struthers asserts that the answer does not indicate that Struthers believed that the sale and use of the "FreCon" equipment and system in it self constituted infringement of Struthers' patents. It simply indicates (1) that Struthers sold equipment which, if employed in the manner disclosed by the Muller patents (e.g., the particular combination of steps there set forth was followed and the precise temperature, pressure and solids content ranges were adhered to) could be used to copy the Muller inventions, and (2) that Struthers believed that General Foods did, in fact, use the equipment in the manner taught by the patents. Struthers further notes that the interrogatory answer stated only that freeze concentration equipment and systems were sold to General Foods, whereas the '007 and '522 patents contemplated a freeze concentration step

followed by a freeze drying step. Similarly, Struthers points out, the article, the brochure, and the deposition testimony upon which Nestle relies refer to freeze concentration, not freeze drying.

Finally, to establish that the sales to General Foods did not include the inventions claimed in the '007 and '522 patents, Struthers offered paragraphs 58-60 of the Neophytos Ganiaris affidavit, which read:

> 58. The applications for the '007 and '522 patents were filed or effectively filed on January 28, 1966. Accordingly, any sales which would be a statutory bar to their validity would have to have taken place proir to January 28, 1965.
>
> 59. The only sale by Struthers to General Foods prior to January 28, 1965 was pursuant to an agreement dated August 12, 1964. That agreement did not provide for any freeze drying apparatus, process technology or know-how. Struthers, for example, did not sell

> 'subjecting said more concentrated extract to relatively complete dehydration by freezing the extract to a solid mass and freeze drying to a moisture content of about 1 to 5 percent at temperatures between about 0° to --45° C.'

as set forth in claims 1(d) of the '007 patent, nor did Struthers sell the combination of claim 1(d) with the remaining steps of that claim.

60. Nor, for example, did Struthers sell either

> 'freezing means for freezing the extract;' or 'means for removing moisture under vacuum from frozen extract by sublimation;' or
>
> 'heat source means coacting with vacuum means for heating and drying the frozen extract.'.

as set forth as subparts (d), (e) and (f) in the '522 patent. The combination of claims 1(d), (e) and (f) with the remaining elements of that claim was likewise not sold to General Foods.

E. Invalidity over the Prior Art

1. Presumption of Validity

The determination of the validity of a patent must begin with the presumption that it is valid, a presumption which can

be overthrown only by clear and convincing evidence. 35 U.S.C. § 282; e.g., Universal Athletic Sales Co. v. American Gym, Recreational & Athletic Equipment Corp., 546 F.2d 530, 540 (3d Cir. 1976), cert. denied, 430 U.S. 984 (1977). The presumption can be overcome by clear and convincing evidence, Aluminum Co. of America v. Amerola Products Corp., 552 F.2d 1020 (3d Cir. 1977), and its effect can be vitiated by a number of factors, such as irregularity in Patent Office procedures or withholding material facts, Monsanto Co. v. Rohm & Haas Co., 456 F.2d 592 (3d Cir.), cert. denied, 407 U.S. 934 (1972), or failure of the examiner to consider relevant prior art during prosecution of the patent application, Phillips Electronics & Pharmaceutical Industries Corp. v. Thermal & Electronics Industries, Inc., 450 F.2d 1164 (3d Cir.

1971).

The presumption of validity of the '007 and '522 patents has been weakened, if not destroyed, by one or both of two factors.

As described above, the examiner reversed himself and allowed claim 1 of the '007 patent and allowed product-by-process claim 5 after a conference with Mr. Drucker and without a written record of the conference or of the reasons for his change of position as to claim 1 or allowance of new claim 5.

It is the purpose of the file wrapper to make available for all to see the entire prosecution of an application, including the reasons rejections were withdrawn and the patent claims were allowed. See Graham v. John Deere Co., 383 U.S. 1, 33 (1966):

> It is, of course, well settled that an invention is construed not only in

> the light of the claims, but also with reference to the file wrapper or prosecution history in the Patent Office. Hogg v. Emerson, 11 How. 587 (1850); Crawford v. Heysinger, 123 U.S. 589 (1887). Claims as allowed must be read and interpreted with reference to rejected ones and to the state of the prior art; and claims that have been narrowed in order to obtain the issuance of a patent by distinguishing the prior art cannot be sustained to cover that which was previously by limitation eliminated from the patent. Powers-Kennedy Co. v. Concrete Co., 282 U.S. 175, 185-186 (1930); Schriber Co. v. Cleveland Trust Co., 311 U.S. 211, 220-221 (1940).

Thus, information concerning allowance of the '007 patent claims is unavailable in the file wrapper, notwithstanding Patent Office rules which require a complete written record of the proceedings.

To that end, Rule 2 of the Patent Office Rules of Practice in patent cases, 37 C.F.R. § 1.2, provides:

§1.2 Business to be transacted in writing.

> All business with the Patent and Trademark Office should be transacted

> in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

Concerning interviews, 37 C.F.R. § 1.133 provides:

* * *

> b) In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for response to Office actions as specified in §§ 1.111, 1.135.

37 C.F.R. § 1.111 (referred to in the Rule quoted above) prescribes:

> §1.111 Reply by applicant.
>
> (a) After the office action, if adverse in any respect, the applicant, if he persist in his application for a patent, must reply thereto and may request reexamination or reconsideration, with or without amendment.
>
> (b) In order to be entitled to reexamination or reconsideration, the

applicant must make request therefor in writing, and he must distinctly and specifically point out the supposed errors in the examiner's action; the applicant must respond to every ground of objection and rejection in the prior office action (except that request may be made that objections or requirements as to form not necessary to further consideration of the claims be held in abeyance until allowable subject matter is indicated), and the applicant's action must appear throughout to be a bona fide attempt to advance the case to final action. A general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references does not comply with the requirements of this section.

(c) In amending an application in response to a rejection, the applicant must clearly point out the patentable novelty which he thinks the claims present in view of the state of the art disclosed by the references cited or the objections made. He must also show how the amendments avoid such references and objections. (See §§ 1.135 and 1.136 for time for reply.)

These rules, all of which were applicable and in force at the relevant times, were duly promulgated pursuant to

35 U.S.C. § 6(a), and consequently have the force and effect of law.

Struthers has filed affidavits of Mr. Drucker and of David J. Galvin, a patent attorney and former patent examiner, asserting that the procedure followed in prosecuting the applications leading to the '007 and '522 patents was proper. They asserted that the papers prepared and filed by the examiner constitute the written record required by Patent Office regulations, and nothing more is required.

At an earlier stage in this case, Nestle moved for partial summary judgment of invalidity and unenforceability of five of the patents in issue (including the '007 patent) on the ground of Struthers' failure to comply with applicable regulations pertaining to prosecution of the applications before the Patent Office. Judge Meanor, who heard the motion, denied it, stating that

assuming "that prosecution of these five patents was not made in full compliance with the rules of the Patent Office, there is no basis in law for granting summary judgment of invalidity". He noted, however, that "an incomplete written record might result in a weakening of the statutory presumption of validity. Hall v. U.S. Fiber Plastics Corp., 341 F. Supp 978 (D.N.J. 1971) (Coolahan, J.)"

Whatever the general practice before the Patent Office may be, it is clear that inadequacies in the written record in the '007 file wrapper constitute a departure from the spirit and purpose of the regulations quoted above. A person reviewing the file wrapper cannot fathom the reasons why certain critical actions were taken, and thus the basis for according the actions of the Patent Office presumptive validity is weakened.

In a subsequent section of this opinion I set forth my reasons for concluding that there is no genuine issue of material fact that the inventions of the '007 and '522 patents were on sale more than one year prior to the date of the patent applications. This fact was not disclosed to the Patent Office. While it can not be held as a matter of law that this non-disclosure constituted fraud on the Patent Office, De Long Corporation v. Raymond International, Inc., 622 F.2d 1135 (3d Cir. 1980), it is a circumstance which weakens the presumption of validity of the '007 and '522 patents, Kraftco Corp. v. Beatrice Foods Co., 342 F. Supp. 1361 (D.N.J. 1971).

Notwithstanding these factors which tend to weaken or destroy the presumption of validity, I shall give the '007 and '522 patents all the benefits of an

unweakened presumption of validity in determining the merits of the remaining grounds of Nestle's motion for summary judgment. I believe the results would be the same with or without the presumption. Cf., Northern Engineering and Plastics Corp. v, Roger Eddy, Docket No. 80-2218 (3d Cir. June 25, 1981), slip op. at 11. As stated in Alco Kar Kurb, Inc. v. Ager, 286 F.2d 931 (3d Cir. 1961):

> But respect for such considered administrative decision does not justify abdication of the normal judicial function. It still remains the responsibility of the United States Courts to see that patent monopoly is enjoyed only pursuant to a correct standard of invention properly applied.

2. Summary Judgment Standards

Struthers correctly states that on a motion for summary judgment only undisputed facts entitle the moving party to prevail, and any genuine issue of material fact must defeat the motion. As

stated in De Long Corp., supra,

> [4] When considering a motion for summary judgment, a court is required to resolve all ambiguities and draw all reasonable inferences in favor of the party against whom summary judgment is sought. United States v. Diebold, 369 U.S. 654, 655, 82 S.Ct. 993, 994, 8 L.Ed. 2d 176 (1962). See Smith v. Pittsburgh Gage & Supply Co., 464 F.2d 870, 879 (3d Cir. 1972). Furthermore, even when the material facts are not in dispute, summary judgment may be inappropriate when contradictory inferences may be drawn from the facts. See United States v. Perry, 431 F.2d 1020 (9th Cir. 1970). Thus, the moving party must demonstrate that there is no genuine issue of material fact and that he is entitled to judgment as a matter of law. See Lockhart v. Hoenstine, 411 F.2d 455 (3d Cir.) cert. denied, 396 U.S. 941, 90 S.Ct. 378, 24 L.Ed.2d 244 (1969).
>
> At 1141.

Nestle urges invalidity of the '007 and '522 patents on the grounds of obviousness over the prior art.

> A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have

> been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.
>
> 35 U.S.C. § 103

While the ultimate question of patent validity is one of law, Great A. & P. Tea Co. v. Supermarket Equipment Corp., 340 U.S. 147 (1950), the determination of validity or invalidity under § 103 is dependent upon three factual inquiries: (i) determination of the scope and content of the prior art, (ii) ascertaining the differences between the prior art and the claims at issue, and (iii) resolving the level of ordinary skill in the pertinent art. Graham v. John Deere Co., 383 U.S. 1 (1966); Northern Engineering and Plastics Corp. v. Roger Eddy, supra.

The subject matter of the art in the

present case is freeze concentration and freeze drying in the manufacture of powdered soluble food products.

In this case the scope and content of the prior art can be readily ascertained by an examination of the exhaustive record consisting of prior art patents and other publications which has been presented to the Court. Similarly, the differences between this prior art and the claims at issue can be readily ascertained by a simple comparison.

Struthers argues strenuously that the third factual inquiry (obviousness to a person having ordinary skill in the art) cannot be made without the assistance of expert testimony, that it has submitted the affidavit of one of its officers, Neophytos Ganiaris, on the subject, that Nestle has submitted nothing in opposition to that affidavit, and that even if Nestle did submit evidence to

contradict Ganiaris there would remain a factual issue precluding summary judgment.

I have concluded, however, that this is a case where the opinion of experts is not necessary, and that I can and should decide the § 103 issue on the basis of the undisputed facts which are in the record. The technology involved is not complex. We are not dealing with difficult chemical, physical, mathematical or electronic concepts or devices. Rather, the patents involved (the '007 and '522 patents and also the other eight patents in suit) are readily understandable and concern processes and devices which employ familiar concepts.

By reason of the multiplicity of the patents in suit and the extensive discovery taken not only in this suit but also in the earlier General Foods litigation, an extensive record is available, and I can only assume that no

portion of that record useful to either party has been omitted from the papers filed in support of or in opposition to Nestle's motions. The facts upon which the decision must be made are established by official records of Patent Office proceedings, documents the authenticity of which is not disputed, and testimony or statements of Struthers' employees.

The motions have been exhaustively briefed by very able counsel and argument was conducted for the better part of four days.

Struthers contends that granting summary judgment in this case would be in conflict with Judge Latchum's decision in Struthers Scientific & Int. Corp. v. General Foods, Corp., 314 F. Supp. 313 (D. Del. 1970), in which he denied General Foods' motion for summary judgment with respect to Struthers patents Nos. 3,381,302 and 3,449,129 (but

not with respect to either Muller patent). Of necessity, the record before Judge Latchum must have been very different from, and far less extensive than, the record in the present proceeding. The instant case had not yet been commenced, and when it was commenced it put in issue a number of patents which were not involved in the General Foods litigation. Further, neither the CCPA opinion in Clinton nor the Board of Appeals decision in Muller II were available to Judge Latchum. In any event, it is necessary that I decide on the basis of the record in this case whether summary judgment is appropriate.

In Borden Co. v. Clearfield Cheese Co., 369 F.2d 96 (3d Cir. 1966), the Court of Appeals adopted the guideline set forth in Messing v. Quiltmaster Corp., 159 F. Supp. 181 (D.N.J. 1958), for determining when a summary judgment

on the question of patent validity is appropriate:

> . . . the court must be certain that it does not need any expert testimony or other extrinsic evidence to explain or evaluate the prior art, or to explain the application of complicated patent descriptions to the subject matter of the patent so that by a mere comparison of the patent in suit with the prior art patents the court can comprehend the similarities or differences in the patents, invalidity for lack of invention being so clearly apparent on the face of the patent that no testimony could change that conclusion.

I believe that this is the kind of case where expert opinion is not required. The basis for this conclusion should become apparent during the course of this opinion as the prior art and the patent claims in issue are discussed. We are dealing with circumstances similar to those in Allen-Bradley Company v. Air Reduction Company, 273 F. Supp. 930 (W.D. Pa. 1967), aff'd, 391 F.2d 282 (3d Cir. 1968), and in C-Thru Products, Inc, v.

Uniflex, Inc., 262 F. Supp. 213 (E.D.N.Y. 1966), aff'd, 397 F.2d 952 (2d Cir. 1968). The Court of Appeals stated, in the latter case:

> In many cases involving a question of patent validity such inquiry involves consideration of technical questions which are often best understood with the aid of expert testimony. But in this case, as Judge Bartels pointed out . . . the prior art and the patent claims are not complex and are easily understandable without expert aid. This is one case where it truly would be 'an absurd waste of time and effort' to deny summary judgment.

3. '007 Patent Prior Art

The subject matter of the '007 patent is a process for making concentrated coffee or tea in dry form by freeze concentration of an aqueous beverage extract in which solids are recovered from the ice crystals and the concentrated extract is freeze dried. As Mr. Drucker stated when he sought to distinguish the 1935 Krause British

patent, "It is the essence of the present invention to start with a suitable concentrate, as does Krause, but there after to subject it only to a cold desiccation so as to avoid the volatilization of delicate flavor substances which would be lost in spray or drum drying . . . " (Ex. 1, p. 21). Thus, the freeze drying element of the process (following freeze concentration) was claimed to be the essence of the invention.

The patent itself sets forth one publication and twenty patents which describe "various processes for freeze concentration" (Col. 3, lines 59-68), as well as two publications and twenty-nine patents which describe "freeze drying processes and equipment". (Col. 4, lines 5-17.)

John G. Muller, the named inventor, testified in the General Foods litigation

that he did not consider freeze concentration of coffee extract, or separating ice from the concentrated extract, or freezing the concentrated extract to the temperatures set forth in his patents, or freeze drying, or the final moisture content of the product, to be new or to be his invention (see Item 1, pp. 1200-1201 in the Struthers Production Book). Muller admitted under oath, "I didn't invent the idea, and I didn't claim I did, of combining freeze concentration with freeze drying." (Pg. 1614).

Nestle has placed in the record numerous patents and other documents constituting prior art. Some were cited by the Patent Office; others were not.

Of particular note is Flosdorf 2,509,681 (1950), which was cited by the Patent Office. It teaches a combination of freeze concentration with freeze

drying (the essence of the '700 invention). It is applicable to various products, including coffee extract. The liquid is preconcentrated in any suitable manner, examples being given of vacuum evaporation and freeze concentration. The preconcentrated product is then frozen, and freeze dried by sublimation under vacuum.

Also to be noted are Irwin 2,292,447 (1942), which was cited by the Patent Office, and Ganiaris 3,283,522 (1966; filed 1963), which was not cited by the Patent Office. The former discloses a process for freeze drying food products, including coffee. It also teaches that in order to reduce operating expenses, the extract should be concentrated prior to freeze drying. The product produced by the process is said to have improved aroma and taste. Ganiaris '522 describes a process for freeze concentrating coffee

extract prior to drying. Extract of 10% solids is concentrated to 46% solids. Ice is separated by centrifugation. The ice is washed and coffee solids are recovered from the washings either by recycling them to the crystallizers or the percolators, or by evaporating water from the washings. Thus, Irwin shows freeze drying of coffee extract which has first been concentrated and Ganiaris shows the concentration procedures of Muller's claims.

Other examples of prior art are referred to in the section of this opinion describing the prosecution of the Muller I application. Still others will be referred to in the subsequent section dealing with the differences between the prior art and the '007 claims.

4. Differences between the Prior Art and the '007 Claims

The Ganiaris affidavit sets forth purported differences between the prior art references and the '007 and '522 claims -- differences, it is argued, which would not have been obvious to a person having ordinary skill in the art to which the subject matter pertained.

As noted earlier in this opinion, the Board of Appeals held that the Muller II claims were unpatentable over the combination of the Ganiaris '522 patent and the Irwin '447 patent. The Board of Appeals correctly noted in its opinion that "the differences between the appealed [Muller II] claims and the ['007] patent claims are so small as to be almost non-existent". For the same reasons that the Muller II claims are unpatentable over the Irwin and Ganiaris patents, the '007 claims are unpatentable

over those patents. Ganiaris' affidavit seeks to demonstrate differences in the prior art which would preclude a finding of § 103 invalidity.

The Irwin reference shows freeze drying of coffee extract which has first been concentrated, and the Ganiaris reference shows the freeze concentration procedure of Muller's claims. In his affidavit (par. 38), Ganiaris states that Irwin does not specifically teach a freeze concentration process which provides "nonoccluded ice crystals". But the Muller II decision relied on the Ganiaris reference, not Irwin, as showing Muller's freeze concentration procedure, a holding which the Ganiaris affidavit significantly does not challenge.

Moreover, "nonoccluded ice crystals" are not mentioned in or a requirement of the Muller claims. Ganiaris' contention does not address anything disclosed or

claimed as being Muller's invention.

As to moisture content (par. 39), Ganiaris' earlier paragraph 20 averment snows it to be a matter of ordinary skill to dry to a moisture level at which the product is stable, while avoiding over-drying. Recitation of matter routinely determined perforce does not impart patentable distinction. Additionally, that feature of the claim reads on and encompasses matter which was known in the prior art and hence does not provide patentable distinction. For example, the July 20, 1964 article on freeze drying published in the journal Chemical Engineering lists coffee as a freeze dried product, and recommends that freeze dried products contain about 2% residual moisture (see first page). So, also, the 1956 Federal Specifications for soluble coffee describe moisture contents of about 3%. And the 1963 Sivetz book on

Coffee Processing Technology (Vol, 2, pages 102-103) not only sets forth the very 1-5% range recited in Muller's claims, but also sets forth the same reasons for those limits which Ganiaris has copied in his affidavit. Consequently, the moisture range recited in Muller's claims does not distinguish over, but, rather, is inclusive of, that prior art knowledge, and does not represent an advance in the art or a patentable distinction.

Ganiaris' paragraph 49 averments concerning his own '522 patent are likewise beside the point and irrelevant. That the '522 concentration procedure could be used to prepare other products is irrelevant; for Ganiaris expressly concedes that the instant coffee referred to in his patent <u>includes</u> freeze dried coffee.

Accordingly, the differences which

Struthers advances between the '007 claims and the prior art applied in Muller II do not impart patentable distinction.

With respect to the Flosdorf '681 patent,[10] Ganiaris advances three differences between it and the '007 patent: (i) It does not specify whether the ice formed in the concentration process would be discrete ice crystals in which coffee solids would not be occluded, as in the case of the '007 patent, or whether the ice would be non-crystalline, in which case the coffee

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10. Earlier in this opinion there is a reference to the CCPA's opinion in (Footnote #10 cont.,) Application of Clinton, et al., 527 F.2d 1226, which invalidated claims virtually identical to those of the '007 patent on the basis of the Flosdorf '681 patent. Thus, the Board of Appeals invalidated claims virtually identical to those of the '007 patent on the basis of Irwin '447 and Ganiaris '522, and the CCPA invalidated such claims on the basis of Flosdorf '681.

solids would be occluded and incapable of being washed off the surface for further use. (ii) With respect to concentration, the '007 patent states what feed (10%-30%) and final concentrate (30%-50%) are required.

Flosdorf '681 gives no indication of the initial concentration. (iii) The '007 patent involves separation of ice crystals by centrifugation, freezing of the concentrated extract to a solid mass and freeze drying it to 1-5% moisture at zero degrees to -45°C. None of these steps and conditions are disclosed by Flosdorf '681.

These differences do not render the '007 patent non-obvious.

Flosdorf '681 repeatedly states that its teachings apply to coffee extract (col. 1, line 3; col. 2, line 7; col. 8, line 4). Flosdorf teaches a "preconcentration" step prior to freeze

drying, carried out "by subjecting the material to partial freezing with formation of a mixture of ice and concentrate and separating the concentrate from the ice, as by centrifuging" (col. 2, lines 17-20), which is the process recited in steps (b) and (c) of '007 claim 1. Flosdorf further teaches that the concentrated coffee extract should optimally have a solids content of "about 50%" (col. 8, lines 9-13), which anticipates Muller's claimed range of "about 30 to about 50 percent".

Flosdorf then subjects the concentrated extract to relatively complete dehydration by freezing it to a solid mass and freeze drying. The extract temperature is maintained at "well below 0°C., usually below -10°C., for example, at --20° to -30°C." (col. 2, lines 30-41), which anticipates Muller's

range.

Thus, the Flosdorf reference describes the steps of the process set forth in '007 claim 1, in exactly the same interrelationship as claimed, for exactly the same purpose. Muller has acknowledged that the individual features of his claims were known, and that he did not invent the idea of combining freeze concentration with freeze drying.

Ganiaris' affidavit does not raise any genuine issue of material fact and acknowledges that Flosdorf '681 discloses freeze concentration of coffee extract. It is a fundamental principle of patent law that features not recited in a claim cannot be relied upon to establish patentability. See Paeco, Inc. v. Applied Moldings, Inc., 562 F.2d 870, 874 (3d Cir. 1977); Smith v. Acme General Corp., 614 F.2d 1086, 1088 n.2 (6th Cir. 1980). Paragraphs 33 and 34 of the

affidavit with regard to "unoccluded ice crystals" and the asserted failure of Flosdorf '681 to teach the formation of unoccluded discrete ice crystals is, accordingly, irrelevant to the claim, as the Muller claims do not mention "unoccluded discrete ice crystals". Moreover, Mr. Ganiaris overlooks that the '007 patent itself expressly acknowledges that formation of "pure ice crystals" in freeze concentration of coffee extract is known in the prior art (col. 1, lines 33-41).

Ganiaris erroneously postulates that Flosdorf merely solidifies the water and does not disclose "separation of ice crystals by centrifugation" (paragraph 36). Ganiaris is simply wrong; Flosdorf expressly discloses forming "a mixture of ice and concentrate and separating the concentrate from the ice, as by centrifuging" (col. 2, lines 18-22).

That is what Muller also described.

Disclosure which is absent from the Muller specification and claims cannot be created via Mr. Ganiaris' assertions. For example, in paragraph 34 he states that the '007 patent involves "the formation of unoccluded discrete ice crystals". That is not a requirement of the Muller patent; to the contrary, it expressly states that "any method of removing the water from the coffee extract by crystallization as ice is applicable to the process of this invention" ('007 col. 3, lines 9-12).

Ganiaris' paragraph 35 averment regarding "initial concentration" of the starting material is contradicted by paragraph 16 of his affidavit, where he states: "Commercial coffee extract usually contains from 10% to about 30% of soluble coffee solids". Thus, those in the coffee industry would understand

Flosdorf's "coffee extract" to mean coffee extract within the initial concentration range broadly stated in Muller's claim. Ganiaris' further assertion that Flosdorf does not disclose that coffee extract can be freeze concentrated to 50% solids is contradicted by the text of the reference, which gives that figure as optimum for coffee and describes preconcentration of the extract by freeze concentration.

With respect to the 1-5% moisture range, the Court of Customs and Patent Appeals held in Clinton that one of ordinary skill in the art practicing the Flosdorf '681 process with coffee would naturally be lead by economic considerations to a suitable moisture content consistent with preserving its properties (527 F.2d 1229). As the Court observed, anyone practicing this old

process would be motivated to use the highest acceptable moisture content and would not waste money drying the coffee further.

Moreover, the 1963 Sivetz text, Coffee Processing Technology, Vol. Two (Tab R-3) (which was not before the CCPA), shows that Muller's 1-5% moisture range was disclosed in the prior art. It is clear from the text that this observation would be equally applicable whether the instant coffee powder had been freeze dried or dried by other means. In the face of this art, there could be no genuine issue of material fact with regard to the 1 to 5% moisture content. Even Mr. Muller testified that the claimed final moisture content was part of the prior art (Muller Dep., Tab R-4, p. 1201, lines 2-12).

Thus, there is no issue of fact with regard to Muller '007 claim 1; it recites

the old Flosdorf '681 process applied to conventional extract as suggested by the reference and terminated when the resulting product reaches the conventional final moisture content known in the prior art.

There is likewise no factual issue with regard to the other '007 claims. As to claim 2, Ganiaris' own patent (Tab O) teaches washing of ice in the centrifuge and recycling of the wash fluid back to the crystallizer, as was noted in the Muller II decision.

Claim 3 recites the old Flosdorf process with recycling of a fluid which contains residual coffee solids to the brewing step. This old expedient is taught by Basset British patent 529,202 (Tab R), and such expedient would be naturally applicable for the exact same purpose as it is used by Basset -- to conserve the coffee solids. Ganiaris'

paragraph 43 averment that Basset's disclosure "could" also be applicable to more dilute extracts does not detract from the force of the reference.

With respect to claim 4, the '007 patent itself (col. 1, ls. 42-47) states that spray drying is an old expedient for treating aqueous solutions of coffee solids. Thus, from the undisputed facts of record, claim 4 recites nothing more than the Flosdorf '681 process with the old washing step and the old expedient of spray drying to recover solids from the wash solution.

The Bedford '633 patent (Tab E) also teaches ice washing in the centrifuge, and this is not disputed in Ganiaris' affidavit. Ganiaris, rather, attempts to distinguish this reference on the basis that Bedford washes with liquor (i.e., unconcentrated feedstock) while "the '007 process uses fresh water for washing"

(paragraph 47). This purported distinction raises no genuine issue, because the '007 claims do not recite the use of water for washing and do not exclude the use of dilute extract or feedstock for this purpose. Indeed, the '007 specification (col. 3, lines 15-17) recites the use of either water or dilute extract for ice washing.

The extraordinary number of earlier patents in the prior art, the large number of texts and articles concerning the subject matter of these patents, and the range of commercial activity in the field disclosed by the undisputed record demonstrate "an intense interest and sophisticated level of skill in the art" at the time of the alleged '007 invention. Northern Engineering and Plastics corp. v. Roger Eddy, supra, slip op. at 7.

Thus, it is apparent upon a review of

all of the prior art references relied upon by Nestle, without the necessity of expert assistance, that the combination of elements involved in claims 1 through 4 of the '007 patent were obvious. They did not involve the exercise of invention. These claims were anticipated in the prior art and were obvious to a person skilled in the art at the time.

Further, the product-by-process claim 5 of the '007 patent is invalid, as it is merely the product of an old and known process.[11]

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11. Nestle advanced additional grounds for invalidating the '007 product-by-process claims even if the process were new. First, Nestle argues that the product cannot be patented because there is no showing how the (Quote #11 cont.,) product differs from freeze dried soluble coffee of the prior art, Application of Brown, 459 F.2d 531 (CCPA 1972). I have not ruled and do not rule upon this contention. Nestle urges that claim 5 is invalid because Struthers failed to comply with Patent Office regulations

(Footnote #11 cont.,)
when it was added to the application a contention previously rejected by Judge Meanor. Finally, Nestle asserts that Struthers' acquiescence in the examiner's rejection of the product-by-process claim in Muller II constituted a cancellation, surrender and abandonment of the claim, citing in support Schriber-Schroth Co. v. Cleveland Trust Co., 311 U.S. 211 (1940). While Struthers' acquiescence in the Muller II prosecution may be suggestive of Struthers' real opinion of the validity of its product-by-process claim, I do not believe Schriber-Schroth precludes Struthers from asserting the validity of claim 5 in the present proceeding. That case simply applies the rule of file wrapper estoppel which prevents a patentee from reclaiming that which he voluntarily surrendered by narrowing the language of the patent to avoid prior art cited by the Patent Office. Continental Oil Co. v. Cole, 634 F.2d 188 (5th Cir. 1981). Even though the claims in Muller I and Muller II were identical in all essential respects, different applications were involved, and I do not believe an action taken in one should be given file wrapper estoppel effect in the other.

5. The '522 Patent

The '522 apparatus patent claims means for performing the process claimed in the '007 patent. Struthers' supplemental answer to Nestle

Interrogatory 62 characterizes the claimed inventive advance as follows:

> The patentees' contribution to the state of the art and the advance made over the prior art lies in provision of a system of apparatus for dehydrating coffee or tea in which a freeze concentration device includes an integral agitator device and an ice separating centrifuge which is connected to a freeze drying device that removes moisture from the freeze concentrated product under vacuum by sublimation and heat. (Emphasis added.)

The prior art descriptions of combined freeze concen tration and freeze drying processes, including those described above (Flosdorf '681, Ganiaris '522 and Irwin '447) necessarily encompass equipment for carrying out those operations. This Struthers does not deny.

In his affidavit Ganiaris seeks to establish at least an issue of fact that the '522 apparatus does more than implement the process of the '007 patent.

In paragraph 50 of the affidavit he asserts that use of the prior art Vogt '864, Vogt '149 and Miller '607 agitated tubular freezers "for ice crystallization from a coffee extract was not known" (emphasis in original).

However, Muller '522 does not contain use claims; it contains apparatus claims. Consequently, the test is whether the claimed apparatus was known in the prior art, and that test is met here.

Moreover, Struthers' own Hedrick patent 3,277,667 (Tab R-5), which has an effective date of June 3, 1964 under 35 U.S.C. § 102(e), describes freeze concentration of coffee using an agitated tubular crystallizer. Thus, Ganiaris' statement that it was not known to use such equipment for such purpose is refuted by Struthers' own patent.

As noted in previous sections of this

opinion, freezing and freeze drying equipment were old in the art. Irwin and Flosdorf provide for conjoining freeze concentration and freeze drying equipment in processing coffee extract. Thus, the combination of apparatus elements claimed in the '522 patent is in the prior art.

Paragraph 52 of the Ganiaris affidavit shows that the "critical distinctions" relied upon by Struthers in connection with the '007 patent -- the concentration, final moisture content and temperature ranges -- are not recited in the '522 claims and, accordingly, cannot be relied upon to establish patentability over the art.

Just as the ice washing and solids recovery features of the '007 process are old, the apparatus for performing such steps in conjunction with the centrifuge, as recited in '522 claims 2 and 3, are also old. See Ganiaris '522 (Tab O) and

Bedford '633 (Tab E).

The other references noted earlier in this opinion also support holdings of invalidity with regard to the '007 and '522 claims. The Ganiaris statements designed to counter the undisputable content of the references rest largely on the proposition that art showing treatment of comestibles other than coffee is not pertinent (e.g., "orange juice concentration disclosures are not relevant prior art with respect to coffee"; paragraph 24). The assertion is refuted by Struthers' sworn preliminary statement in Interference 97,038 (Tab R-6), which advanced as a "description" of the '007 process Mr. Muller's letter of August 14, 1963 referring to the process as one to "concentrate food liquids such as orange juice by freezing".

Further refutation is found in STRUTHERS "FRECON" PROCESS - QUESTIONS

AND ANSWERS (Item 7), which lists both coffee extract and orange juice among a host of products suitable for freeze concentration. Moreover, Struthers' own patent disclosures, such as the Hedrick patent (Tab R-5), describe the applicability of the same concentration technology to both orange juice and coffee extract. Ganiaris' averments that data for juice may not be the same as for coffee (paragraph 23), or that experiments performed on juice may not give the optimum conditions for coffee (paragraph 24) evade the point that the same freeze concentration process is applicable to coffee, as the references show.

Thus, Ganiaris' affidavit does not raise a material invention to those elements.[12] Rengo Co. Ltd. v. Molins

12. At the time of the hearing on Nestle's motion directed to the Muller

(Footnote #12 cont.,)
patents I reserved decision on Nestle's contentions that: (i) the '522 patent is invalid for double patenting and (ii) the '522 patent is invalid over the '007 patent. In view of my conclusion that the '522 patent is invalid for obviousness under § 103, it is unnecessary to address these contentions.

Machine Company, Inc., Docket Nos. 80-2556 & 80-2557 (3d Cir. July 20, 1981).

F. Invalidity by reason of Prior Sale

35 U.S.C. § 102(b) provides that a person shall not be entitled to a patent if "the invention was . . . in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States . . . ". An offer for sale is invalidating under the statute. Philco Corp. v, Admiral Corp., 199 F. Supp. 797 (D. Del. 1961).

In order to sustain a finding of invalidity under the "on sale" ban of § 102(b) it must be shown (1) that "the alleged invalidating sale was of a device substantially identical to that claimed

under the terms of the patent", De Long Corp. v, Raymond International, Inc., supra, 622 F.2d at 1141; (2) that the invention alleged to have been offered for sale had been reduced to practice at the time of that sale, Austin v. Marco Dental Products, Inc., 560 F.2d 966 (9th Cir. 1977), cert. denied, 435 U.S. 918 (1978); Hobbs v. Atomic Energy Commission, 451 F.2d 849 (5th Cir. 1971), and (3) that the sale was for commercial exploitation of the invention rather than for experimental purposes, In re Yarn Processing Patent Validity Litigation, 498 F.2d 271 (5th Cir.), cert. denied sub nom. Sauquoit Fibers Co. v. Leesona Corp., 419 U.S. 1057 (1974). The party asserting the "on sale" defense has the burden of proving the defense by clear and convincing evidence. Minnesota Mining & Manufacturing Co. v. Kent Industries, Inc., 409 F.2d 99 (6th Cir.

1969).

It does not appear to be contested that the invention alleged to have been offered for sale had been reduced to practice at the time of the offers and sale or that the offers and sales relied upon by Nestle were for commercial exploitation rather than for experimental purposes. Struthers contends, however, that at the very least there is a factual dispute as to whether the pertinent offers or sales were made prior to the critical date, January 28, 1965, and as to whether what was offered or sold constituted the Muller '007 and '522 inventions.

The offers for sale and sales upon which Nestle relies are described in an earlier section of this opinion. In addition, Nestle relies upon Struthers' supplemental answer to Nestle Interrogatory No. 50:

> 50. Respondents believe that General Foods Corporation has infringed United States Letters Patent Nos. . . . 3,404,007 . . . 3,495,522 . . . . The basis of such belief lies in the fact that Struthers Scientific and International Corporation in 1964 and 1965 sold freeze concentration equipment and systems to General Foods for use in freeze concentrating coffee extract and General Foods did in fact freeze concentrate coffee extract with said equipment. . . . .

Nestle contends that the interrogatory answer is sufficient to show identity between what was sold and the claims at bar, "for the rule is well established that 'that which infringes, if later, would anticipate if earlier'". Knapp v. Morss, 150 U.S. 221, 228 (1893).

Struthers contends that the interrogatory answer states that only freeze concentration equipment and systems were sold to General Foods, which is only one of the two steps in the Muller inventions, the other being freeze drying. In Struthers words (Brief, p.

96), the answer "simply indicates (1) that Struthers sold equipment which, if employed in the manner disclosed by the Muller patents (e.g., the particular combination of steps there set forth was followed and the precise temperature, pressure and solids content ranges were adhered to) could be used to copy the Muller inventions, and (2) that Struthers believed that General Foods did in fact use the equipment in the manner taught by the patents".

There is sufficient ambiguity in the interrogatory answer to preclude relying upon it for summary judgment, De Long Corp. v. Raymond Intern., Inc., supra, 622 F.2d at 1141.

Further, paragraphs 59 and 60 of the Ganiaris affidavit must be accepted as true, namely, that the only sale by Struthers to General Foods prior to January 28, 1965 was pursuant to an

agreement dated August 12, 1964, and that that agreement did not provide for any freeze drying apparatus, process technology or know-how. Accepting that statement as true, however, does not end the matter. That affidavit does not deal with what was offered (as distinguished from sold) to General Foods and what was offered and sold to entities other than General Foods. Similarly, it does not deal with Struthers' expectation that its FreCon process for freeze concentration would be used by purchasers of the process in conjunction with a freeze drying step.

The pre-January 28, 1965 offers for sale and sales detailed above in this opinion are not denied by Struthers. Nor does Struthers disavow the documents which show that it contemplated that the freeze concentration processes and equipment which were the subject of those

offers for sale and sales were to be used in conjunction with a freeze drying step.

The November 27, 1964 Struthers "FreCon" Process Questions and Answers described "a freeze concentration plant as the first step followed by freeze drying" (Item 7). Struthers knew that General Foods intended to use the Struthers freeze concentration equipment in the manufacture of freeze dried MAXIM soluble coffee. Ganiaris' own memorandum of December 1, 1964 to Muller (Item 15) makes this abundantly clear:

> The writer obtained the following information during his last visit to Maxwell House at Hoboken, New Jersey:
>
> * * *
>
> 2. New Processes: The SSI [Struthers Scientific International] freeze concentration unit is connected to two new processes: (1) Freeze-drying; (2) Low Temperature Spray-Drying. There is not any indication that the 'FreCon' product will be introduced into their conventional spray-dryers.
>
> The freeze-drying plant is under

construction and will be located in the same building with the 'FreCon' unit.

* * *

4. Start-up: The official date for the start-up of the 'FreCon' unit is January 4, 1965. However it appears that the start up will be at the end of January in order to coincide with the start-up of the freeze drying operation.

Struthers does not and cannot deny that prior to January 28, 1965 it offered for sale and sold its FreCon freeze concentration process and equipment for use in conjunction with a freeze drying process and equipment. This combination is the essence of the alleged Muller '007 and '522 inventions. As discussed earlier in this opinion, the particular concentrations, temperatures and pressures specified in the patents were already well known or obvious. That someone else might supply the freezing and freeze drying hardware for use in the conjoined processes does not detract from

the combined processes, the combined apparatus having been placed in the prior art. Timely Products Corp. v. Arron, 523 F.2d 288, 302 (2d Cir. 1975):

> The complete invention claimed must have been embodied in or obvious in view of the thing offered for sale. [citations omitted] Complete readability of the claim on the thing offered is not required because whatever is published (or on sale) more than one year prior to the filing of a patent application becomes part of the prior art over which the claim must be patentable. [citations omitted].

The material facts are not in dispute; nor may contradictory inferences be drawn from these facts. They establish that the inventions of the '007 and '522 patents were in public use or on sale in the United States more than one yeer prior to January 28, 1966. Nestle is entitled to summary judgment of invalidity on this ground under 35 U.S.C. § 102(b).

G. Conclusion

For the reasons set forth above, Nestles's motion for summary judgment of invalidity of the Muller '007 and '522 patents will be granted on the grounds of obviousness over the prior art, 35 U.S.C. § 103, and prior offer of sale and sale, 35 U.S.C. § 102(b).

III. The Ganiaris '295 and '034 Patents

Nestle's Group II motion for summary judgment of invalidity and/or unenforceability was directed to Ganiaris patents 3,531,295 (the '295 patent) and 3,620,034 (the '034 patent). Nestle urged the following grounds for the relief it sought:

1. The '034 patent is invalid because the application upon which it issued became abandoned by operation of law.[13]

13. Nestle urged that Struthers' failure to make a written response to an official

(Footnote #13 cont.,)
action of the Patent Office mailed to it on January 8, 1971 and relying instead on a telephone conference with the examiner constituted a violation of applicable Patent Office rules and an abandonment of the patent as a matter of law under 35 U.S.C. § 133. The statute provides that failure to prosecute an application within the prescribed time shall constitute an abandonment unless it be shown to the satisfaction of the Commissioner that the delay was unavoidable. Struthers did respond within time, although not in the manner
(Footnote #13 cont.,)
prescribed by the applicable regulations. 37 C.F.R. §§ 1.111(b), 1.133(b). In my oral opinion on June 9, 1981 I denied the motion on this ground for the reason that the issuance of the patent by the Patent Office constituted the Commissioner's acceptance of the procedures followed and precluded a conclusion that the patent had been abandoned as a matter of law, Cf., BEC Pressure Controls Corp. v. Dwyer Instruments, Inc., 380 F. Supp. 1397 (N.D. Ind. 1974) (Commissioner of Patents did not have discretion to permit revival of a patent application deemed abandoned under the applicable statute for late payments of the issue fee).

2. The '295 patent is invalid because the application upon which it issued became abandoned by operation of

law.

3. The '295 patent is invalid under 35 U.S.C. § 112.

4. The '295 patent is invalid under U.S.C. § 102(f).[14]

5. The '295 patent is invalid over the prior art, including prior offer for sale, sale and use.[15]

6. The '295 patent is invalid under 35 U.S.C. § 102(d).

7. The '034 patent is invalid over the prior art, including prior offer for sale, sale and use.[16]

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14. Nestle relies upon a Struthers interrogatory answer to establish that Ganiaris' conception of the invention claimed in the '295 patent took place on May 19, 1965, a month after the subject matter of the invention was discussed with General Foods. This, Nestle contends, establishes that Ganiaris did not himself invent the patented subject matter and the patent is invalid under 35 U.S.C. § 102(f). Struthers asserted that its interrogatory answer was in error and submitted an affidavit of Ganiaris asserting that he conceived the invention prior to the conferences with General Foods. At the June 9, 1981 hearing I

(Footnote #14 cont.,)
ruled that Ganiaris' affidavit raised an issue of fact on this point and consequently I denied Nestle's motion based on § 102(f) grounds.
15. At the hearing held on June 9, 1981 I denied summary judgment on that aspect of Nestle's prior art contentions relying on prior offer for sale, sale and use of the '295 patent for the reason that there were factual issues as to whether the alleged invention claimed in that patent was a subject of the General Foods transaction. After a further review of the record I have concluded that denial of summary judgment on the ground of prior sale was correct but for a different reason than the one upon which I relied on June 9, 1981. I do not decide at this time whether there is a genuine issue as to whether Struthers sold the invention claimed in the '295 patent to General Foods. I do conclude that there is a genuine issue as to whether any such sale took place prior to the pertinent one-year period. Later in this opinion I hold that the '295 patent is entitled to a December 8, 1965 filing date and not an April 16, 1969 filing date, as contended by Nestle. This has a
(Quote #15 cont.,)
significant impact upon Nestle's § 102(b) theory and makes it impossible to decide that the sale of the '295 invention (if there were such a sale) indisputably took place more than one year prior to that date.

16. At the hearing held on June 9, 1981 I also denied summary judgment on that aspect of Nestle's prior art contentions relying on prior offer for sale, sale and use of the '034 patent for the reason

(Footnote #16 cont.,)
that there were factual issues as to whether the alleged invention claimed in that patent was a subject of the General Foods transaction. As in the case of the '295 patent prior sale contentions, a further review of the record suggests that while the conclusion was correct, the reason for it was not. I do not decide at this time whether there is a genuine issue as to whether Struthers sold the invention claimed in the '034 patent to General Foods. I do conclude that there is a genuine issue as to whether any such sale took place prior to the pertinent one-year period. In a subsequent section of this opinion I hold that the '034 patent is entitled to a December 8, 1965 filing date and not a July 11, 1967 filing date, as contended by Nestle. Using this date it is impossible to decide that the sale of the '034 invention indisputably took place more than one year prior to that date.

8. The '034 patent is invalid by reason of double patenting.

9. The '034 patent is invalid under 35 U.S.C. § 112.

10. The '295 and '034 patents are unenforceable by reason of Struthers' withholding of material facts from the Patent Office.[17]

At the June 9, 1981 hearing on the Group II motion I reserved decision in whole or in part on contentions 2, 3, 5, 6, 7, 8 and 9 above. This Part of the opinion disposes of the reserved issues.

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17. On June 9, 1981 I denied Nestle's motion based upon asserted withholding of material facts from the Patent Office for

(Footnote #17 cont.,)
the reason that there remain genuine issues of material fact. De Corp. v. Raymond Intern., Inc., supra. Digital Equipment Corp. v. Diamond, 653 F.2d 701 (1st Cir. 1981).

A. Description of the Patents

1. The Ganiaris '295 Patent

The process of freeze concentration of coffee extract (or other comestible extracts) was discussed above in connection with the Muller freeze concentration/freeze drying patents. When a part of the water is removed from the extract by freeze concentration, some of the viscous concentrate tends to adhere to the ice crystals after centrifuging and some becomes occluded in the ice (see discussion of the phenomenon in connection with the Muller patents). It is quite apparent that recovery of the adhering and occluded extract is economically desirable, and that is the objective of the '295 patent, which is entitled "Freeze Concentration of Coffee Extract".

The abstract of the disclosure reads, "A process of freeze concentrating coffee extract is described in which a mixture of ice and coffee is separated in a centrifuge. The ice is thereafter washed to include a finite amount of coffee and melted to recover entrained coffee solids therefrom."

Claim 1 of the '295 patent describes recovery of the adhering and occluded extract by washing and melting the ice. Claims 2 through 5 set forth variants of the procedure of washing and melting the ice and, in some cases, reusing the

resulting diluted extract at an earlier phase of the freeze concentration process.

The claims in their entirety read as follows:

What is claimed is:

1. A process for preparation ofconcentrates of coffee which comprises:

(a) extracting roast ground coffee with hot water to form an aqueous extract having 15-30% dissolved solids therein;

(b) partially freezing said extract to form a mixture of ice and more concentrated extract having at least 20% dissolved solids therein;

(c) separating said ice from said more concentrated extract by centrifuging under conditions whereby a portion of said more concentrated extract adheres to said ice;

(d) reducing the amount of said more concentrated extract adhering to said ice to a finite amount less than 5% by weight of said ice by washing and centrifuging;

(e) melting said ice to a solution containing dissolved extract which is less than 5% by weight of said melted ice; and

(f) recovering coffee solids from said melted ice.

2. A process according to claim 1 in which the solution from step (e)

is used in step (a) to form additional concentrated extract, thereby preventing loss of soluble coffee solids as a result of step (c).

3. A process for the preparation of concentrates of coffee which comprises:

(a) extracting roast ground coffee with hot water to form an aqueous extract having 15-30% dissolved solids therein;

(b) partially freezing said extra mixture of ice and a more concentrated extract having at least 20% dissolved so therein;

(c) separating said ice from said more concentrated extract by centrifuging under conditions whereby a portion of said more concentrated extract adheres to said ice;

(d) reducing the amount of said more concentrated extract adhering to said ice to a finite amount of dissolved extract solids, less than 5% by weight of said ice, by washing in a centrifuge with fresh water or dilute coffee extract and centrifuging;

(e) melting the ice and combining said ice melt and said adhering extract therein from step (d) with liquid coffee extract to form a combined extract; and

(f) recovering coffee solids from said combined extract.

4. The process of claim 1 wherein the amount of said more concentrated extract adhering to said ice crystals is reduced in step (d) by washing the ice crystals with water resulting in spent water and ice crystals, each having small amounts of said extract.

5. A method accorking to claim 1 in which coffee solids are recovered from the washings of the ice.

2. The Ganiaris '034 Patent

This refreshingly brief patent is entitled "Multi-Stage Freeze Concentration of Coffee". It is directed to the same problem as the problem to which the '295 patent was directed, namely, recovering the coffee solids which may adhere to or be occluded in the ice produced during the freeze concentration step.

The abstract of the disclosure reads: "In a staged freeze concentration process for concentrating coffee solution, ice crystals are removed from the system after the first stage from

less concentrated coffee solution. Ice crystals removed from the more concentrated coffee solution in the second stage are added to incoming feed. Coffee solution from which ice crystals are separated in the second stage is removed from the system as product."

The subject matter of this patent clearly is similar to the '295 patent. Claim 1 (and therefore each of the other claims, which are in dependent form) is restricted to starting with a liquid containing about 24% coffee solids. Just why this figure was selected is not disclosed in the specification. The features mentioned in the claims include melting ice by mixing it with feed solution, using melted ice as a wash liquid, and recycling washings to the feed.

The claims read as follows:

What is claimed is:

1. A process for the preparation of a concentrate of coffee from a liquid containing about 24% coffee solids which comprises (a) partially freezing aqueous coffee extract in at least two serially connected crystallizer passes to form a mixture of about 20-30% by weight of ice and a concentrated extract, (b) separating said ice by centrifugation from said mixture under conditions whereby a portion of said concentrated extract adheres to said ice, (c) reducing the amount of said concentrated extract adhering to said ice by centrifuging and by washing in the centrifuge with addition of wash water or melted ice (d) melting the ice to form a dilute solution which contains the coffee which had been adhering to the ice and (e) recovering coffee solids from said melted ice.

2. In the freeze concentration according to claim 1, the steps of:

(a) removing ice from the concentrated coffee solution and mixing with feed solution to melt therein; and

(b) removing the concentrated coffee solution from the system as a product.

3. The process according to claim 2 with the additional steps of:

(a) melting to some extent the ice removed from coffee solution to form a wash liquid;

(b) washing ice with the wash liquid; and

(c) recycling the wash liquid after washing ice into the feed.

4. The process according to claim 3 with the additional step of:

recycling at least some of the concentrated coffee solution into the feed.

5. A process as claimed in Claim 1 in which coffee solids are recovered from wash water after washing.

B. Prosecution of the Ganiaris Applications

Four Ganiaris applications for patent, all of which were owned and prosecuted by Struthers, are pertinent. The first application (Ganiaris I; Serial No. 321,020; Ex. 4) resulted in Patent 3,283,522 (the '522 patent), which is not here in suit, and was not asserted against General Foods. The second application (Ganiaris II; Serial No. 512,365; Ex. 5) became abandoned by

reason of Struthers' failure to pay the base issue fee after allowance of claims in that application. The third application (Ganiaris III; Serial No. 816,596; Ex. 6) resulted in patent 3,531,295 (the '295 patent) here in suit. The fourth application (Ganiaris IV; Serial No. 652,532; Ex, 7) resulted in patent 3,620,034 (the '034 patent) here in suit.

1. THE GANIARIS I APPLICATION

In November, 1963 Struthers filed the Ganiaris I application in the name of its employee, Neophytos Ganiaris, for a multi-stage freeze concentration process.

The application, as filed, contained, inter alia, product-by-process claims (e.g.: "2. A concentrated aqueous solution made by the process of claim 1."). The first official action, mailed

February 11, 1966, rejected the product-by-process claims as being improper, "since the product cannot be defined by the process of making it unless it cannot otherwise be defined" (Ex. 4, p. 33). In response to that rejection, Mr. Drucker cancelled the product-by-process claims (Ex. 4, p. 36).

After further prosecution the Ganiaris I application issued as a patent in November, 1966.

2. THE GANIARIS II APPLICATION

In December, 1965 Struthers filed the Ganiaris II application. The application, as filed, did not refer to or claim benefit of the filing date of any other application for patent, nor was it ever amended to contain any such reference or claim. (See, however, discussion in Part H(1) of Struthers'

attempt to amend Ganiaris II after it had become abandoned.) So, also, neither the declaration (Ex. 5, p, 14) nor the subsequently filed supplemental oath (Ex. 5, p. 44) referred to or claimed benefit of any prior application.

The Ganiaris II application claimed a freeze concentration process in which the separated ice is melted and used to prepare fresh extract (Ex. 5, p. 12). The examiner's first action, mailed July 1, 1966 (Ex. 5, p. 21), rejected several of the claims under 35 U.S.C. § 112 "as failing to particularly point out and distinctly claim what applicant regards as his discovery". The claims were also rejected over prior art. Several claims were rejected under § 102 as fully met by the 1940 Basset British Patent 529,202 (Tab O). Application claims 3 and 4, which added the features of washing the ice prior to melting it and returning the

washings to the crystallizer, were rejected as being obvious in view of Basset taken with Struthers' own Svanoe Canadian patent 699,247 (Tab P). As to the ice-washing feature, the examiner said, "it would be well within the expected purview of one having ordinary skill in this art to wash the ice crystals and return the wash water containing adhering extract, as recited in these claims, because such a feature is known to the freeze concentration art, as note Svanoe". In addition, the examiner required that an abstract be supplied pursuant to Rule 72(b) (37 C.F.R. § 1.72(b)).

A response filed by Mr. Drucker (Ex. 5, p. 26) cancelled certain claims and amended claim 1. The accompanying remarks asserted that the claims "are now limited to the extent of washing prior to separation and melting to ensure low

solids in ice". Amended claim 1, however, made no mention of washing the ice. It was also urged by Mr. Drucker to be "critical" that the ice be washed to reduced the concentration of solids "to below 5% by weight before melting"; but the portion of the specification he cited p. 5, lines 19-30; Ex. 5, p. 8 does not contain any statement of criticality; it only states it to be "preferred" that the melted ice contain up to 5% by weight of dissolved coffee solids.

Later a supplemental amendment was filed by Mr. Drucker's associate (Mr. Cantor) (Ex. 5, p. 29). It supplied an abstract and further amended claim 1 to add the step of reducing the amount of extract adhering to the ice crystals to an amount less than 5% by weight of the ice. The supplemental amendment also presented a dependent claim to washing the ice with water in order to reduce the

amount of adhering extract.

In an action mailed December 13, 1968, the examiner again rejected all the claims, and that rejection was made FINAL (Ex. 5, p. 32).

Thereupon an interview was had with the examiner. On the inside cover of the file wrapper (Ex. 5, p. 48) there is a handwritten note reflecting the interview with Examiner Maurice W. Greenstein. That reads:

12/19/68 MWG Mr. Drucker Mr. Cantor	Proposed claim more limited which is fully supported by Spec., pointing up necessity for centrifugation at solids level claimed for extract and also for washing + recycling.

Seemingly in contrast to the examiner's note of the interview, the ensuing further amendment filed January 23, 1969 (Ex. 5, p. 35) asserted in its remarks that newly added claims 13 and

14, described at the interview, "were indicated to be allowable". Various numerical limitations were added in new claims 13 and 14.

The Patent Office later ruled that the January 23, 1969 amendment filed in response to the final rejection did not comply with the requirements of 37 C.F.R. § 1.111, which, in part, provides:

> (c) In amending an application in response to a rejection, the applicant must clearly point out the patentable novelty which he thinks the claims present in view of the state of art disclosed by the references cited or the objections made. He must also show how the amendments avoid such references or objections.

The Patent Office ruling that the January 23, 1969 response was insufficient came more than a year later in the Ganiaris III application, after the Quality Control operation of the Patent Office had reviewed that amendment filed in Ganiaris II. The Patent Office held:

> It should be noted that applicant's response in his parent case [Ganiaris II, Serial No. 512,365] does not comply with the provisions of Rule 111 since there was no specific argument as to the inapplicability of the references applied in the rejection.
>
> (Ex. 6, p. 32.)

No further or supplemental response to the final rejection in Ganiaris II was filed. Instead, concurrently with the amendment discussed above there was filed a petition to make the application special and accelerate the grant of a patent (Ex. 5, p. 39). Prosecution on the merits was accordingly closed (Ex. 5, p. 41), and an examiner's amendment was made with the agreement of Mr. Cantor (Ex. 5, p. 42).

A notice of allowance was mailed March 20, 1969 (Ex. 5, p. 45), which required payment of the issue fee within three months, else the application would become abandoned. The issue fee was not

paid, and the application consequently became abandoned. See 37 C.F.R. § 1.316.

3. THE GANIARIS III APPLICATION (The '295 Patent)

On April 16, 1969, after the notice of allowance in Ganiaris II had been mailed, Struthers filed the Ganiaris III application (Serial No. 816,596; Ex. 6).

The application was said to be a "division of Ganiaris II (Ex. 6, pp. 4, 15). In the first official action, mailed September 23, 1969, the examiner took exception to styling of the case as a "division" of Ganiaris II and demanded amendment of the specification and submission of a new oath (Ex. 8, p. 18).

The Ganiaris III specification is essentially the same as that of Ganiaris II. Original claims 3 and 4 of Ganiaris III correspond to allowed claims 13 and 14 of Ganiaris II, but Ganiaris III

contained three additional process claims, an apparatus claim and a product-by-process claim (Ex. 6, pp. 12-14). The examiner required restriction between the process claims (including the product-by-process claim) and the apparatus claim (see 35 U.S.C. § 121 and 37:C.F.R. § 1.142). Pursuant to Mr. Drucker's election of the process subject matter, the examiner acted on the process claims.

The process claims were rejected under § 112 "as failing to particularly point out and distinctly claim what applicant regards as his discovery". They were additionally rejected as unpatentable over the 1963 Sivetz publication (Tab R) in view of the 1940 Basset British patent (Tab O) and the 1965 McKay patent (Tab J) or the 1964 Svanoe Canadian patent (Tab P). Product-by-process claim 8 was also

rejected as unpatentable over the freeze concentrated coffee extracts of the prior art. Mr. Drucker thereupon had an interview with the examiner,

The response entered December 19, 1969 (Ex. 6, p. 25), following the interview, cancelled the product-by-process claim and certain other claims, and presented new claims 9-11. The accompanying remarks thanked the examiner for the interview "at which the proposed form of the claims was discussed". A complete written statement of the reasons presented at the interview as warranting favorable action was not filed (see 37 C.F.R. § 1.133(b). The remarks asserted that certain claims "were neither taught nor suggested by the art of record, particularly in view of step (d)" but did not appear to meet the requirements of 37 C.F.R. § 1.111(b)), which provides, in part:

> A general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references does not comply with the requirements of this section.

Referring to the interview, the remarks asserted that "Original claims 3 and 4 were agreed still to be allowable for reasons of record in the parent case [Ganiaris II]." No reasons were advanced for withdrawing the rejection of those claims over the different prior art references cited in Ganiaris III; and the statement also appears to be inaccurate, as claim 3 was not allowed by the examiner (see Ex. 6, p. 28).

Nevertheless, several claims were allowed following a further telephone discussion between the examiner and Mr. Drucker (Ex. 6, p. 28). A notice of allowance was mailed March 27, 1970 (Ex. 6, p. 30) and the issue fee was paid April 2, 1970.

The Ganiaris III application was then considered by the Quality Control operation of the Patent Office. An official letter mailed April 16, 1970 (Ex. 6, p. 31) stated that the record of the parent case (Ganiaris II) and this application (Ganiaris III) had been carefully considered, and proposed to withdraw the Ganiaris III application from issue for the purpose of reinstating the rejection of the claims as unpatentable over prior art as set forth in the last Office Action, dated September 23, 1969.

The official letter, written by a different examiner (Mr. Golian) and approved by the Group Director (Ex. 6, p. 34), again objected to designation of the application as a "division", and pointed out that applicant had presented no reasons in support of that designation. The official letter also held:

It is not considered that the prosecution of this application complies with the statute, rules, and Patent Office practice and procedure.

Applicant in his response to the Office Action of September 23, 1969 failed to comply with the provisions of Rule 111 and 119. See 714.02 to 714.04 M.P.E.P.

Applicant in the amendment filed December 19, 1969 did not point out the specific distinctions believed to render the new claims patentable over the applied references.

Further, applicant's argument that original claims 3 and 4 were allowable for the reasons of record in the parent case [Ganiaris II] is not such a response as the nature of the case required. Each application should be complete in itself and not depend on another application for a complete understanding of applicant's position. It should be noted that applicant's response in his parent case does not comply with the provisions of Rule 111 since there was no specific argument as to the inapplicability of the references applied in the rejection. Moreover, the argument in applicant's parent case has no pertinency since the applied art relied upon in the rejection in this case is different than that applied in the parent case. In addition, claims 9, 4, 6 and 10 do not depend on claims 3 and 4 as argued.

> It is pointed out that there is no specific argument directed to the references relied upon in the rejection. The argument that the claimed process 'is neither taught nor suggested by the art of record particularly in view of step (d)' is not understood.
>
> (Ex. 6, pp. 32-33.)

The official letter went on to point out the pertinency of the cited art, and said applicant had thirty days within which to respond by way of argument of amendment.

Mr. Drucker responded (Ex. 6, p. 35). He acquiesced in the objection to designation of the application as a division, and amended accordingly. Three pages of discussion of the cited art followed, and Mr. Drucker concluded:

> It is believed that this case has gone at least once through Quality Control and the present state of the prosecution is unusual.
>
> (Ex. 6, p. 38.)

The amendment was entered and the '295 patent issued on September 29, 1970.

4. THE GANIARIS IV APPLICATION (The '034 Patent)

On July 11, 1967, Mr. Drucker filed a short application (four pages plus claims) in the name of Ganiaris (Serial No. 652,532; Ganiaris IV; Ex. 7). Neither the application as filed nor its oath referred to any prior United States application; but the oath did refer to application 31831/66 filed in Great Britain on July 15, 1966 (a copy of the British provisional application appears at pp. 20-26 of Ex. 7). The British application, in turn, does not refer to any prior application.

In the first official action, mailed December 8, 1969 (Ex. 7, p. 12) all claims were rejected over the 1966 Ganiaris patent 3,283,522 (Tab K) (which issued on the Ganiaris I application, filed November 4, 1963) or the 1958 Findlay patent 2,851,368 (Tab D). A

response was received by the Patent Office on May 7, 1970.

The response cancelled all the claims and substituted new claims 7-12. Mr. Drucker argued that Struthers' Ganiaris '522 patent was not an effective reference because its November 8, 1966 issue date was antedated by the July 15, 1966 filing date of British application 31831/66. The British application is referred to in the declaration of the Ganiaris IV application, and benefit of its filing date (priority) is claimed under 35 U.S.C. § 119.

A second official action, mailed July 15, 1970 (Ex. 7, p. 27), rejected the new claims under § 112 as unduly broad, and also rejected claim 8 as drawn to new matter (35 U.S.C. § 132). All of the new claims were additionally rejected for double patenting (35 U.S.C. § 101) in view of the subject matter claimed in the

Ganiaris '522 patent. The rejection was made FINAL.

Mr. Drucker's response, filed October 13, 1970 (Ex. 7, p. 29) cancelled claim 8 and amended the application to assert that it was a continuation-in-part of the abandoned Ganiaris II application (Serial No. 512,365 filed December 8, 1965). No new oath or declaration containing the averments required in continuation-in-part applications was submitted.[18] Neither did Mr. Druckerpoint out in what respect, if any, the abandoned Ganiaris II application contained a written descrption of the

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18. As stated in the PTO Manual of Patent Examining Procedure (M.P.E.P.), §201.08, "a continuation-in-part is an application filed during the lifetime of an earlier application by the same applicant, repeating some substantial portion or all of the earlier application and adding matter not disclosed in the said earlier case". The special form of oath required in such applications is shown at 37 C.F.R. § 3.18.

subject matter claimed in the present (Ganiaris IV) application.

A terminal disclaimer executed by Mr. Drucker in his capacity as vice-president of Struthers Scientific was also submitted (Ex, 7, p. 30). It disclaimed that portion of the term of any patent issuing on Ganiaris IV which would extend beyond expiration of the '522 patent.

The remarks portion of the amendment comprised two sentences. The first sentence referred to the terminal disclaimer. The second sentence was a general allegation of patentability. The remarks did not point out the patentable novelty the claims were believed to present in view of the state of the art disclosed by the cited references. Neither was it shown how the amendment avoided the rejection. Compare 37 C.F.R. § 1.111.

In a further action, mailed January 8, 1971 (Ex. 7. p. 33), the final rejection was withdrawn and claims 7 and 12 were rejected as drawn to obvious matter in view of the 1965 Lund patent 3,205,078 (Tab I). Claims 7 and 12 were further rejected for double patenting over the Ganiaris '295 patent, which had issued on the Ganiaris III application.

No written response was made to the January 8, 1971 rejection of claims. Compare 37 C.F.R. § 1.111(b).

Accordingly, one cannot tell how the examiner was persuaded to withdraw the art rejection over Lund, and the separate double patenting rejection over the '295 patent. The examiner's amendment dated April 5, 1971 (Ex. 7, p. 37) acknowledges a telephone interview with Mr. Drucker and makes certain changes in claim 7 which are stated to have been "approved" during that interview. The interview resulted in allowance of claims 7-12, but there is no written statement of the reasons presented at the interview as warranting favorable action. Compare 37 C.F.R. § 1.133(b). There is similarly no written record of how the amendments to the claims are supposed to have avoided the references applied in the art rejection or the separate double patenting rejection (37 C.F.R. § 1.111).

A notice of allowance was mailed April 23, 1971 (Ex. 7, p. 45), and the

base issue fee was paid on May 10, 1971 (Ex. 7, p. 46). Also, on May 10, 1971 there was filed a supplemental oath (Ex. 7, p. 43) in which Ganiaris averred that the subject matter of the allowed claims was invented before he filed his "original application Serial No. 512,365" (Ganiaris II).

Over a month after prosecution had been concluded and the base issue fee had been paid, Mr. Drucker filed, on June 16, 1971, a further paper (Ex. 7, p. 40) amending the specification to assert not only that Ganiaris IV is a continuation-in-part of Ganiaris II, but also to assert that Ganiaris II is a continuation-in-part of Ganiaris I (Serial No. 321,020, now the '522 patent). There was concurrently submitted a new declaration claiming priority of Ganiaris I under 35 U.S.C. § 120 (Ex. 7, p. 41). A month earlier

Ganiaris had sworn, in the Ganiaris IV supplemental oath, that Ganiaris II was his " original application" in respect of the subject matter claimed in the Ganiaris IV application (Ex. 7, p. 43).

As the June 16, 1971 papers purporting to claim benefit of the Ganiaris I application filing date were filed after prosecution of Ganiaris IV had been concluded, there was no outstanding issue to which they were pertinent and no occasion for the examiner to determine whether the Ganiaris IV application was, in fact and in law, entitled to benefit of the Ganiaris I filing date. They were entered as pertaining to formal matters.[19]

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19. The PTO markings on the June 16, 1971 amendment (Ex. 7, p. 40) reflect that it was entered pursuant to Order No. 3311. As set forth in IB Horwitz, Patent Office Rules and Practice 1503 (1980), Order No. 3311 of May 22, 1935 provides,

(Footnote #19 cont.,)
"Hereafter amendments submitted after the notice of allowance of an application which embody merely the correction of formal matters in the specification, or formal changes in a claim without changing the scope thereof, or the cancellation of claims from the application, shall be acted upon by the Primary Examiner and not forwarded to the Commissioner (as represented by the Supervisory Examiner) for approval."

C. Prior Sale-- Nestle's and Struthers' Contentions

1. Facts Relied upon by Nestle:

Nestle relies upon the same facts to support invalidity of the '295 and '034 patents on prior offer to sell, sale or use grounds as those it relied upon in connection with the Muller patents. In particular, Nestle refers to the following:

The August 12, 1964 contract between Struthers and General Foods confirms that the process and equipment sold to General Foods included a "Melter Tank" (Item 8, Ex. A, Part I). Nestle contends that

there was nothing but ice to melt. Struthers' answer to Interrogatory 119 in the General Foods litigation asserts that washing ice with melted ice from the melt tank was disclosed orally to General Foods engineers in the period August 18, 1964 to July 29, 1965, and was shown on a drawing furnished to General Foods by Struthers on August 6, 1965, a date prior to the contract of sale (¶ 26). Nestle argues that there could be no reason for such disclosure unless that subject matter were on sale, or had been sold, and that using melted ice for washing is one means of recovering solids from the melted ice.

Like comments apply to ¶ 86 of the answer, which deals with using the melted ice in the extraction step or in the soluble coffee-making process to recover solids therefrom. That, too, was disclosed beginning in August, 1964,

showing it to have been on sale or sold.

And in ¶ 89 it is admitted that use of melted ice was disclosed in "operating instructions" given to General Foods, further confirming that the matter was on sale and sold. ¶ 87 confirms that washing with dilute coffee solution was physically incorporated into the first Hoboken plant in 1964. ¶¶ 90 and 92 also show that using the melted ice was disclosed in 1964.

Item 19 is General Foods' September, 1964 memorandum describing the operation of Struthers' mobile (flat car) FreCon plant at Hoboken the previous August. Reference to the flow diagram appended to that memorandum shows that ice was delivered to a melt tank (right side of diagram) and that melted ice containing about 1% solids was recycled at the rate of 550 pounds per hour to the first stage centrifuge. At the page numbered 50352

the memorandum recommends certain improvements for incorporation in the unit Maxwell House was buying. The sixth of these is sending the melt stream to rework rather than recycle with the system.

2. Facts Relied upon by Struthers:

In the affidavit which Struthers filed in response to the claim of prior sale or offer to sell, Ganiaris admitted that Struthers "disclosed to General Foods that recovery of coffee solids, and recycling of melted ice to extractors, evaporators, spray drvers is possible". However, he further stated:

> 3. The subject matter of the '295 and '034 patents were not sold to General Foods Corporation ("General Foods") more than one year before the filing of the applications for '295 and '034 or before my invention thereof. The sales contract between Struthers and General Foods dated August 12, 1964 does not mention that the loss of coffee solids is related to coffee solids in the ice or that

the ice should be recycled to recover solids or that any attempt should be made to recover the coffee solids from the melted ice. Indeed, the equipment and system as supplied to General Foods in 1964 had no provisions for the recovery of coffee solids from melted ice. Melted ice was considered waste.
4. The answers to General Foods' interrogatories (noted in Nestle Br., p. 45-48) in the Delaware litigation do not indicate that recovery of coffee solids from the melted ice was incorporated in the FreCon system sold to General Foods in 1964. Struthers only disclosed to General foods that recovery of coffee solids, and recycling of melted ice to extractors, evaporators, spray-dryers, is possible.

D. Abandonment of the '295 Patent

On April 16, 1970, subsequent to the allowance of the Ganiaris III application upon which the '295 patent issued, an official letter (Ex. 6, p. 31) was written, stating:

> It is not considered that the prosecution of this application complies with the statute, rules and Patent Office practice and procedure.

> Applicant in his response to the Office Action of September 23, 1969 failed to comply with the provisions of Rule 111 and 119. See 714.02 to 714.04 M.P.E.P.

The official letter goes on to point out the respects in which the response was deficient.

35 U.S.C. § 133 provides that upon failure of applicant to prosecute the application within six months after any action therein, or in such shorter time (not less than thirty days) as the Commissioner may fix, "the application shall be regarded as abandoned by the parties thereto, unless it be shown to the satisfaction of the Commissioner that such delay was unavoidable". Regulations promulgated by the Commissioner established what is necessary to constitute adequate prosecution of the application by the applicant. 37 C.F.R. § 1.135 provides:

> §135. Abandonment for failure to response within time limit.
> (a) If an applicant fails to prosecute his application within six months after the date when the last official notice of any action by the Office was mailed to him, or within such shorter time as may be fixed (§1.136), the application will become abandoned.
>
> (b) Prosecution of an application to save it from abandonment must include such complete and proper action as the condition of the case may require. The admission of an amendment not responsive to the last official action, or refusal to admit the same, and any proceedings relative thereto, shall not operate to save the application from abandonment.
>
> (Emphasis supplied.)

The required content of a "complete and proper" response to an official action is governed by 37 C.F.R. §§1.111 and 119, to which the official letter referred. The official letter asserted that the applicant had not complied with the statute and the rules in responding to the official action of September 23, 1969. From this Nestle urges that the

application accordingly became abandoned by operation of law. It argues that even though Struthers responded to the requirements of the Quality Control Board by filing a new submission which was designed to remedy the defects specified by the Quality Control Board, this submission was long after the time specified by the applicable statute and regulations and could not have the effect of reviving an already abandoned application.

Struthers' initial response to the abandonment argument, namely, that abandonment is a question of fact as to which the intention of the inventor is controlling, is not well taken. We are not dealing with a situation as to which intent has any bearing whatsoever. The sole issue is one of law, whether given the undisputed facts the statute and regulations require that the application

for the '295 patent be deemed abandoned as a matter of law.

Struthers further argues that there was no finding that Struthers' initial response to the Official Action of September 23, 1969 was inadequate. This is a rather difficult position to sustain in view of the devastating criticisms which the Quality Control Board leveled at the response and given the major changes in the application which Struthers effected by its response to the action of the Board.

Nestle relies upon Lorenz v. Finkl, 333 F.2d 885 (CCPA 1964), to support its argument that in light of the mandatory language of 35 U.S.C. § 133 and the applicable regulations, the failure of the Patent Office to treat the Ganiaris III application as abandoned and the issuance of the '295 patent notwithstanding Struthers' failure to

file an amendment which was a complete and proper action as the condition of the case required was ultra vires and void. In that case the examiner finally rejected the Lorenz application on prior art on June 19, 1959. The six-month period for a response expired on December 21, 1959. On December 6, 1959 Lorenz filed an amendment which was not adequate to meet the final rejection and he failed to file a notice of appeal by December 21, 1959. Pursuant to a suggestion of the examiner, in June, 1960 Lorenz filed an amendment requesting that a suggested claim be entered for purposes of interference. This was done and an interference with Finkl was declared. Finkl urged that the "irregularity or informality in the declaration of the interference is based on the fact that the Lorenz application was abandoned long prior to the institution of this

interference". The CCPA majority agreed with Finkl and ruled that "According to [the Patent Act of 1952], failure of an applicant to 'prosecute' an application within six months after any action therein, of which notice has been given or mailed to the applicant, results in the application becoming abandoned", at 889.

Notwithstanding the majority opinion in Finkl, I do not think a reviewing court should hold a patent invalid when an applicant files, within time, an amendment which is at least colorably responsive to the examiner's action and when the Patent Office itself decides to treat the amendment as sufficient so as not to require a finding of abandonment. To rule otherwise would require the reviewing court to involve itself in the minutiae of Patent Office proceedings and to second-guess the Patent Office on

procedural issues at every turn.

Some flexibility is contemplated by Patent Office procedures. The Manual of Patent Examining Procedure expressly confirms that the Patent Office may provide an applicant an additional period (up to thirty days) to submit a more complete response to an examiner's action. § 714.03 of the M.P.E.P., entitled "Amendments Not Fully Responsive, Action to be Taken", provides, in relevant part:

> Where a bona fide response to an examiner's action is filed before the expiration of a permissible period, but through an apparent oversight or inadvertence some point necessary to a complete response has been omitted, such as an amendment or argument as to one or two of several claims involved or signature to the amendment, the examiner, as soon as he notes the omission, should require the applicant to complete his response within a specified time limit (usually one month) if the period has already expired or insufficient time is left to take action before the expiration of the

> period. If this is done the application should not be held abandoned even though the prescribed period has expired.

Judge Rich's dissenting opinion in Lorenz v. Finkl suggesting that the Patent Office has considerable discretion in applying its procedural rules is persuasive.

Struthers' inadequate response to the September 23, 1969 Official Action is not without over-all significance in this case. It represents another instance of Struthers' casual approach to obtaining patents in this art and its agility in juggling and skirting Patent Office rules in its quest. However, viewed in isolation, I do not believe the inadequacy of the response is a basis for granting Nestle's motion for summary judgment on the ground of abandonment of the Ganiaris III application.

E. Invalidity of the '295 Patent under § 112

The first paragraph of 35 U.S.C. § 112 requires that the invention be described in full, clear and exact terms in the specification. The '295 patent specification states the invention to comprise the usual freeze concentration steps together with

> Melting the ice having adhering mother liquor, and returning the melt to the extraction step.
>
> (Col. 2, lines 7-9.)

The drawing forming part of the patent clearly shows that melted ice leaving melter 20 is passed back to a point ahead of the extractor, as confirmed at col. 4, lines 14-16 of the patent. There is no description in '295 of recovering coffee solids from the melted ice by any other means.

The '295 patent issued on Ganiaris III application, which, as stated in

column 1 of the patent, is a continuation of the Ganiaris II application (Serial No. 512,365). The specifications of Ganiaris II and Ganiaris III are essentially identical. The originally filed claims of Ganiaris II included the step of using the melted ice to form additional extract (see claim 1 of Ganiaris II at Ex. 5, p. 12; the remaining original claims being dependent from claim 1, they likewise included that feature). Allowed claim 13 of the Ganiaris II application and dependent claim 14 (Ex. 5, pp. 35-36) also specified using the melted ice solution to form additional extract. It will be recalled that Struthers allowed the Ganiaris II application to become abandoned by failing to pay the issue fee.

Instead of obtaining the issuance of a patent upon the Ganiaris II application, Struthers prosecuted the

Ganiaris III application. This application was virtually identical to Ganiaris II except that the claims (but not the description) were broader. Clause (f) in claim 1 of the '295 patent (which is carried into the other claims) is not limited to returning the melted ice to the extraction step. Rather, it purports to cover any process for "recovering coffee solids from said melted ice". There are a number of methods for recovering the coffee solids from the melted ice other than returning it to the extraction step.

Nestle urged that because the claims are indisputably broader than the invention described in the specification and, consequently, not supported by the specification, the patent is necessarily invalid. See Application of Sus, 306 F.2d 494, 505 (CCPA 1962);

> An applicant cannot under 35 U.S.C. §112 claim a broader invention than that set forth in the written description contained in his specification.

Nestle also relies upon Application of Winkhaus, 527 F.2d 637 (CCPA 1975)

In his affidavit directed to this issue Ganiaris as much as concedes that the specification does not describe a general process for recovering coffee solids from the melted ice. He argues, however, that "[t]he only reason for recycling the melted ice to the extraction [sic] is to recover coffee solids from said melted ice" and, further, that the spirit of the invention is to recover the solids from the melted ice which has been generated as a result of the processing steps (a) through (e)."

This is not a particularly persuasive answer to Nestle's contentions. I do not think the '295 patent could be enforced

against a person who recovered coffee solids from melted ice by means other than returning the melted ice to the extraction step, yet this is what Struthers asserts it has a right to do. In Sus the description of the invention called for the use of particular aryl azides in a light sensitive material and process. The challenged claims, however, called for "aryl and substituted aryl radicals" generally. The Court held that the claims failed to meet the requirements of § 112 in that they were broader than the written descriptions thereof as set forth in the specification. The '295 patent suffers from the same defect and, consequently, is invalid.

This is not a situation such as that which exists in certain other patents which Nestle claims do not comply with § 112. It is not a situation where there

is ambiguity or an inadequate description which can be fleshed out by one skilled in the art. In such a situation it might well be "unduly parsimonious" to declare the patent invalid on § 112 grounds. Rengo Co. Ltd. v. Molins Machine Company, Inc., Docket Nos. 80-2556 & 80-2557 (3d Cir. July 21, 1981), slip op. at 28. In the case of the '295 patent, by way of contrast, a narrow invention is described and a much broader invention is claimed. That clearly constitutes a failure to meet § 112 requirements and Nestle is entitled to summary judgment of invalidity of the '295 patent on that ground.

F. Invalidity of the '295 Patent over the Prior Art - Obviousness

1. Applicable '295 Filing Date

The Ganiaris III application which resulted in the '295 patent was filed on

April 16, 1969. However, it was filed as a continuation of the Ganiaris II application and thus, relying on 35 U.S.C. § 120, Struthers claims the filing date of that application, namely, December 8, 1965. Nestle contends that the '295 patent is not entitled to the benefit of any filing date earlier than the filing date of the Ganiaris III application upon which it was issued by reason of the failure of the Ganiaris II application to disclose the invention claimed in the '295 patent as required by § 112.

As stated in Hinde v. Hot Sulphur Springs, Colorado, 482 F.2d 829, 834 (10th Cir. 1973), "[t]o come within Section 120, the [continuation patent] must: (1) disclose an invention described in the manner provided in 35 U.S.C.A. § 112 in an earlier application; (2) be by the same inventor; (3) be filed

before the patenting of the earlier application; and (4) contain a specific reference to the earlier application". The '295 patent indisputably meets requirements 2, 3 and 4.

I have ruled in the preceding Part of this opinion that the '295 specification is not adequate under § 112 to support the '295 claims in that the specification describes recovery of coffee solids by returning melted ice to the extraction stage whereas the claims are not limited to recovering coffee solids by returning melted ice to the extraction step. Similarly, the Ganiaris II application's specification and claims are limited to recovering coffee solids by returning melted ice to the extraction step, whereas the claims of the '295 patent, which purports to be a continuation of the Ganiaris II, are much broader. The question is posed whether, for the

purposes of § 120, Ganiaris II discloses the '295 invention in the manner prescribed in § 112. Posed differently, are the description requirements of § 112 to be applied in a less stringent manner when determining whether a patent is entitled to an earlier filing date pursuant to § 120?

If claimed subject matter is not described in the parent application and is disclosed for the first time in the continuation application, the latter is not entitled to the filing date of the former, Carter-Wallace, Inc. v. Otte, 474 F.2d 529 (2d Cir. 1972), cert. den., 412 U.S. 929 (1973); Application of Van Langenhaven, 458 F.2d 132 (CCPA 1972); General Foods Corporation v. Perk Foods Co., 419 F.2d 944 (7th Cir. 1969), cert. den., 397 U.S. 1038 (1971).

On the other hand, "[a] mere embellishment, or technical improvement,

of a feature disclosed in the original application, which does not contribute to its novelty, utility, or non-obviousness, does not deprive a continuation-in-part application of its validity, or a patentee of the original filing date of the parent application". Acme Highway Products Corp. v. D.S. Brown Company, 431 F.2d 1074, 1081 (6th Cir. 1970), cert. den., 401 U.S. 956 (1970); see also Hinde v. Hot Sulphur Springs, Colorado, supra.

I conclude ultimately that the entire '295 patent is invalid as obvious over the prior art. For similar reasons, had the issue arisen, the "invention" described in the Ganiaris II application would be found to be obvious. It follows that the embellishment which the '295 patent added to the Ganiaris II application was obvious -- obviousness superimposed on the obvious. For this reason, and for the purposes of this

§ 120 discussion, I conclude that the new material incorporated in the '295 patent was a mere embellishment or technical improvement which does not contribute to the novelty, utility, or nonobviousness of the "invention" described in the Ganiaris II application. For the purposes of the prior art and prior sale analyses, therefore, I shall give the '295 patent the benefit of the Ganiaris II filing date -- December 8, 1965.

2. Prior Art

Nestle urges that it is entitled to summary judgment of invalidity of the '295 patent under 35 U.S.C. § 102(b) since the invention was patented or described in a printed publication more than one year prior to the date of the application for patent in the United States. Based on the same facts, Nestle contends that it is also entitled to

summary judgment of invalidity on the grounds of obviousness under 35 U.S.C. § 103. I have concluded that Nestle is entitled to summary judgment under § 103 but have not made a further determination as to whether the '295 patent is sufficiently identical to certain of the prior art so as to entitle Nestle to summary judgment on § 102(b) grounds as well.

In the section of this opinion dealing with the Muller patents (Part II(E)) I have set forth the law (applicable to this section as well) relating to the criteria for determining obviousness, the presumption of validity, and the appropriateness of summary judgment.[20] I also set forth what I have found to be the undisputed facts as to the art involved in this case and the degree of skill possessed by one having ordinary skill in that art at the

pertinent time.

The prior art relevant to the '295 patent and the manner in which it anticipates and renders obvious the alleged inventions of the '295 patent can be briefly summarized.

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20. Throughout all of its briefs Struthers seeks to answer Nestle's legal contentions concerning the appropriateness of summary judgment on § 103 grounds by citing Diamond v. Diehr, 49 U.S.L.W. 4194 (U.S. Sup. Ct. Mar. 3, 1981), for the proposition that "it is inappropriate to direct the claims into old and new elements and then to ignore the presence of the old elements in the analysis. This is particularly true in a process claim because a new combination of steps in a process may be patentable even though all the constituents of the combination were well known and in common use before the combination was made." Struthers, however, ignores the fact that the issue in Diamond v. Diehr was whether the patent involved fell within the § 101 categories of possible patentable subject matter. It did not deal with the question of novelty or non-obviousness and, as the Supreme Court pointed out, "it may later be determined that the respondents' process is not deserving of patent protection because it fails to satisfy the statutory conditions of novelty under § 102 or nonobviousness under § 103". In other words, the Supreme Court was not addressing the

(Footnote #20 cont.,)
issues which are before us in the present case.

The file wrapper of the '295 patent contains Mr. Drucker's acknowledgement that the 1963 Sivetz reference cited by the PTO (Tab R) shows "all of steps (a), (b) and (c) of [application] claims 9 and 11" (Ex. 6, p. 36), which became patent claims 1 and 3, the two claims of the.'295 patent which are in independent form.

The 1940 Bassett British patent (Tab O), which is directed to freeze concentration of coffee, supplies both these steps and the remaining steps. Every step of '295 claim 1 is in this reference, and Bassett conducts those steps in the same order and for the same purpose. Bassett extracts roast ground coffee with hot water to form an aqueous extract (claim step (a)). The reference describes extracts (infusions) which may

be dilute, of medium concentration or strong, and Ganiaris' Group I affidavit (¶ 16) acknowledges that commercial coffee extracts have solids contents within the claimed range. Bassett further describes partially freezing the extract to form a mixture of ice and more concentrated extract, note page 1, lines 44-47 (claim step (b)). Bassett then describes separating the ice from the more concentrated extract by centrifuging (claim step (c)), as well as washing the surface of the ice and the use of an excess of washing water, as note page 2, lines 2-7 and 115 (step (d)). Bassett further describes melting the ice (step (e)) and recovering solids therefrom (step (f)) by using the melt to prepare additional extract, as note page 2, lines 50-52 and 57-61. Indeed, Bassett describes melting the ice to provide "a weak coffee solution which is used to

produce a further infusion which is in turn subjected to the same [freeze concentration] treatment" (p. 3, lines 36-39).

Bassett's purpose, moreover, is to achieve "a total recovery of the primary materials", i.e., the coffee solids (page 1, lines 26-27). That is the same as Ganiaris' stated purpose, viz., "utilizing all of the dissolved coffee solids adhering to the ice crystals from the centrifugation step" ('295 col. 3, lines 42-44).

Struthers' selection of 5% as the maximum solids level in the melted ice (in contrast to the 2.5% of Ganiaris' 1965 "conception") cannot avoid the invalidating impact of the prior art. The 5% maximum is not disclosed in the '295 patent to be critical; quite to the contrary, it is said only to be "preferred" (col. 3, line 34).

Consequently, the 5% limit cannot establish patentability because it is not a critical limit which distinguishes from what has gone before. Standard Oil Co. v. Tide Water Associated Oil Co., 154 F.2d 579, 585 (3d Cir. 1946). Repatenting that which is old and in the public domain would be all too easy if all that were required were to slip in an appropriate number here and there. As the Tide Water Court put it, the plaintiff suing on such a patent

> has clothed old ideas with an ephemeral semblance of novelty. The knowledge it seeks to monopolize was open for the world to see, before plaintiff showed it in his patent.
>
> (154 F.2d at 591.)

As the Bassett reference shows, the ice crystals removed from a liquid concentrate contain adhering or interstitial concentrated liquor, which can lead to serious economic loss. See also the September 7, 1965 Lund patent

3,205,078 (Tab I, at col. 1, lines 28-38). Various expedients to recover the residual solids were well within the skill of the art. One such expedient is washing of the ice, with recycle or other recovery of solids from the washings, as shown in the 1952 Sperti patent 2,588,337 (Tab C), which evaporated the washings to recover solids; in the 1964 Walker patent 3,156,571 (Tab H), which recycled or evaporated the washings to recover solids; in the 1961 Cole patent 2,967,778 (Tab G); and in the 1944 Bedford patent 2,354,633 (Tab A), over which the Cole patent was held invalid. See Sperti Products, Inc. v. The Coca-Cola Company, 272 F. Supp. 441 (D. Del. 1967), aff'd per curiam, 399 F.2d 607 (3d Cir. 1968).

Another expedient for recovering solids entrained with the ice was to recycle the ice to the extraction step. That expedient is shown in Bassett,

supra, and in the 1960 Bilenker patent 2,949,364 (Tab F, see Fig. 9 and col. 6, lines 13-40); and the 1965 Lund patent 3,205,078 (Tab I; col. 4, lines 9-13).

Step (e) of claim 3, which calls for combining the ice melt with liquid coffee extract, is satisfied by recycling the melt to be combined with extract entering the freeze concentration system, as shown in the references discussed above, or by routing the melt to the extractor, where it combines with freshly produced extract, also shown in the references discussed above. Claim 4 is merely functional in stating the obvious consequence that washing the ice crystals results in both the wash water and the ice crystals containing small amounts of extract. Claim 5 merely adds the notorious expedient of recovering solids from the washings, which is the whole point of washing and is shown in the

prior art discussed above.

Struthers filed an affidavit of the inventor, Ganiaris, and in paragraphs 7 through 18 of the affidavit he seeks to establish that "none of the prior art references cited by Nestle and discussed in ¶¶ 7-17 above disclose the complete combination of steps as claimed in '295".

Mr. Ganiaris' averments regarding Bassett's alleged lack of "intention to form discrete ice crystals in suspension of the extract solution" are irrelevant because only the features included in the claims can be considered in assessing the differences between the claimed invention and the prior art. Paeco, Inc. v. Applied Moldings, Inc., 562 F.2d 870, 874 (3d Cir. 1977); Smith v. Acme General Corp., 614 F.2d 1086, 1088 n.2 (6th Cir. 1980). '295 claim 1 does not state that the mixture of ice and more concentrated extract must be a suspension of discrete

ice crystals. In any event, Bassett's crushed block of ice is "a mixture of ice and more concentrated extract" and, therefore, meets the claim.

Moreover, Mr. Ganiaris' assertion that Bassett does not intend to form discrete ice crystals is contradicted by express statements in the reference. Crystallization of ice is described by Bassett at page 1, lines 53 and 59. Bassett also explicitly states that "crushing of the ice may be dispensed with if the infusion is agitated during the freezing stage, as the ice is then formed in small crystals" (p. 2, lines 120-124).

With regard to Ganiaris' paragraph 11 averments, Bassett plainly teaches using an "excess of wishing water" (p. 2, line 115) and washing until "white ice" is obtained (p. 1, line 104).

In paragraph 12 of his affidavit

Ganiaris states that the melted ice in Bassett '202 is a weak solution and there is no data in the prior art to indicate that a weak solution has less than 5% coffee solids. He further states that the "limit of 5% can be achieved only if the ice crystals are formed as pure discrete ice crystals (substantially no occlusion) in accordance with steps (a), (b) and (c) of the '295 patent".

Ganiaris' alleged invention can be ascertained only from the patent itself, and not from the inventor's later assertions. Further, there is an absence of any such teaching in the specification, which 35 U.S.C. § 112 requires if it be part of the invention. The asserted advantage achieved by the preparation of "unoccluded" ice cannot be relied upon here. See Tinnerman Products, Inc. v. George K. Garrett Co., 292 F.2d 137, 140 (3d Cir. 1961), cert.

denied, 368 U.S. 833 (1961):

> The applicable law is clear that where the particular feature relied upon is nowhere mentioned as an advantage it cannot form the basis of patentability.

Finally, Ganiaris' own specifications negate his newly announced requirement that there be substantially no occlusions of coffee solids in the ice:

(1) "However, any method of removing the water from the coffee extract by crystallization as ice is applicable to the process of this invention" (col. 3, lines 12-25); and (2) "In the melting apparatus 20, the ice with adhering or occluded concentrated coffee solution is melted to result in dilute coffee solution" (col. 4, lines 12-14). The patent specification is thus directly contrary to Ganiaris' current contention that the patent provides or requires unoccluded ice crystals.

It may well be that the '295 patent is invalid under 35 U.S.C. § 102(b) as having been anticipated in earlier patents or other publications. Be that as it may, if there be any differences distinguishing the '295 patent from the prior art described above, they would have been obvious at the time the invention was made to a person having ordinary skill in the art. Therefore, Nestle is entitled to summary judgment of invalidity of the '295 patent on the grounds of obviousness under 35 U.S.C. § 103.

G. Invalidity of the '295 Patent under § 102(d)

Struthers' French patent 1,419,922 (Tab Q; translated in the attached certified document obtained from British opposition 1,196,601), which corresponds to the Ganiaris I application, was

applied for (Demande) on November 3, 1964 and was patented (Delivre) on October 25, 1965. The October, 1965 French patenting date is prior to the December, 1965 filing date which the '295 patent claims. The November, 1964 French application date is more than twelve months prior to the December, 1965 date. 35 U.S.C. § 102(d) provides, in relevant part:

> A person shall be entitled to a patent unless --
>
> (d) The invention was first patented or caused to be patented * * * by the applicant or his legal representatives or assigns in a foreign country prior to the date of the application for patent in this country on an application for patent * * * filed more than twelve months before the filing of the application in the United States * * * .

The claims ("Resume") of the French patent (translated as "summary") specify:

> A. Process for concentrating an aqueous solution by forming ice crystals therein and separating the ice crystals from the residual solution so as to recover the

residual solution as a concentrate, the process being characterized by the following points, separately or in combinations:

> 2. Wash water is recycled in the system.
>
> 5. The ice is recycled and passes from a later stage to an earlier stage.

Nestle contends that all claims of the '295 patent (except claim 2, which calls for recycling the ice to the extraction step) are invalid under § 102(d). DuPlan Corp. v. Deering Milliken Research Corp., 487 F.2d 459 (4th Cir, 1973), cert. den., 415 U.S. 978 (1974). Nestle further contends that all claims, including claim 2, are invalid and unenforceable by reason of Struthers' failure to identify the French patent in the declaration forming part of Ganiaris III, Struthers' failure otherwise to bring the French patent to the attention of the Patent Office during prosecution of Ganiaris III, and the assertion in the

Ganiaris III declaration that "this invention has not been patented in any country foreign to the United States on an application filed by me or any legal representatives or assigns more than twelve months before my parent application";[21] and the further assertion that "no application for patent on this invention has been filed in any country foreign to the United States, except as follows [applications filed abroad in 1966 are listed]" (Ex. 6, p. 15). See Chromalloy American Corp. v, Alloy Surfaces Co., 339 F. Supp. 859, 872 (D. Del. 1972).

In response to these contentions Struthers relies upon paragraphs 19 and 20 of the Ganiaris affidavit. He stated that in the French patent there is one

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21. A like statement appears in the supplemental oath sworn to by Ganiaris after allowance of Ganiaris III (Ex. 6, p. 40).

stream (feed) entering the plant and two streams (a product stream and an ice stream) leaving the plant. "The ice stream leaving the plant cannot be recycled back to the plant for the recovery of coffee solids. Any attempt to recycle this ice stream will defeat the purpose of concentration. The '295 patent, on the other hand, discloses a process which teaches the recycling of melted ice (the effluent stream from a freeze concentration plant) either to the extraction process or to some other process for recovering the coffee solids. In short, the Struthers' French '922 patent refers to internal recycling (within the freeze concentration system), whereas the '295 patent refers to external recycling (outside the freeze concentration system)."

In view of my conclusion that the '295 patent in its entirety is invalid

under § 103, I have not made the analysis required to determine whether it is invalid in whole or in part under § 102(d). This opinion, therefore should not be regarded as a ruling either way on that issue.

H. Invalidity of the '034 Patent over the Prior Art - Obviousness

1. Applicable Filing Date

The Ganiaris IV application on which the '034 patent issued was filed on July 11, 1967. At the time the Ganiaris IV application was filed it claimed the benefit under 35 U.S.C. § 119 of British application 31831/66, filed July 15, 1966, nearly a year earlier. It might be noted parenthetically that even that date was too late to avoid serious problems with respect to a prior sale defense based upon the transactions between Struthers and General Foods which took

place in 1964 and 1965.

By means of patent practice legerdemain Struthers succeeded in having the '034 patent issue with the benefit of the November 4, 1963 date of the Ganiaris I application. It accomplished this in the following manner. Before the close of prosecution, Ganiaris IV was amended (Ex. 7, p. 29) to assert that it was a continuation-in-part of the abandoned Ganiaris II application (Serial No. 512,365, which had a filing date of December 8, 1965). After all prosecution had been concluded, and after the base issue fee had been paid, Ganiaris IV was further amended to assert that Ganiaris II was, in turn, a continuation-in-part of Ganiaris I (Serial No. 321,020) (Ex. 7, p. 40), thus supposedly giving the '034 patent the benefit of the Ganiaris I filing date of November 4, 1963, a date which was comfortably earlier than the

Struthers-General Foods transactions.

Not surprisingly, Nestle challenges the right of Struthers to claim any filing date for the '034 patent earlier than July 11, 1967, the date it was filed.

a. Ganiaris I and II Filing Dates

In order to follow Nestle's argument it is necessary to have in mind the various filing and issuance or termination dates of the four Ganiaris applications. They can be shown diagramatically as follows:

Ganiaris I '522 Patent	Filed 11/4/63	-------- 	Issued 11/8/66
Ganiaris II	Filed 12/8/65	--------	Abandoned 6/20/69
Ganiaris III '295 Patent	Filed 4/16/69	-------- 	Issued 9/29/70
Ganiaris IV '034 Patent	Filed 7/11/67	-------- 	Issued 11/16/71

It will be noted that Ganiaris I and

II co-existed for a time. That is to say, Ganiaris I was issued after Ganiaris II was filed and before Ganiaris II was deemed abandoned for non payment of fees. Ganiaris II, however, never asserted that it was a continuation of Ganiaris I.

It will also be noted that Ganiaris IV and Ganiaris II co-existed for a time. That is to say, Ganiaris II was abandoned after Ganiaris IV was filed and before Ganiaris IV issued as the '034 patent. Ganiaris IV was amended to assert that it was a continuation-in-part of the Ganiaris II application.

Finally, it will be noted that Ganiaris IV and Ganiaris I never co-existed. That is to say, Ganiaris I had issued as the '522 patent before Ganiaris IV was filed.

35 U.S.C. § 120 provides as follows:

§ 120. Benefit of earlier filing date in the United States

> An application for patent for an invention disclosed in the manner provided by the first paragraph of section 112 of this title in an application previously filed in the United States, or as provided by section 363 of this title, by the same inventor shall have the same effect, as to such invention, as though filed on the date of the prior application, if filed before the patenting or abandonment of or termination of proceedings on the first application or on an application similarly entitled to the benefit of the filing date of the first application and if it contains or is amended to contain a specific reference to the earlier filed application.

Applying the provisions of the statute I conclude that the amendment of Ganiaris IV to assert that it was a continuation-in-part of Ganiaris II was effective to give Ganiaris IV the benefit of the December 8, 1965 filing date of Ganiaris II. I am assuming that there was sufficient disclosure of the invention in Ganiaris II to meet the requirements of § 112. Ganiaris II was filed previously to Ganiaris IV; Ganiaris

IV was filed before the termination of proceedings on Ganiaris II; and Ganiaris IV was amended to contain a specific reference to Ganiaris II.

Applying the provisions of § 120, I conclude that the amendment of Ganiaris IV which purported to amend Ganiaris II to assert that Ganiaris II was a continuation-in-part of Ganiaris I was a boot-strapping operation which was not effective to give Ganiaris II and thus Ganiaris IV the benefit of the Ganiaris I filing date. Even though Ganiaris I met the requirements of § 112 and even though Ganiaris I was filed previously to Ganiaris II, Ganiaris II was never effectively amended to contain a specific reference to Ganiaris I as required by § 120. That section does not contemplate assertion of a continuation-in-part by the posthumous amendment of the earlier patent. After the Ganiaris II

proceedings had terminated through non-payment of the fee, it was not possible for Struthers to breathe life into the dead body and to amend Ganiaris II through the vehicle of amending Ganiaris IV. The cases upon which Struthers relies do not support its position. In each there was a chain of three patent applications. In each case the second application in the chain referred to the first and the third in the chain referred to the second but not to the first. The Court held, in each case, that because the third application did not refer to the first, it was not entitled to § 120 benefit of the filing date of the first. Sampson v. Ampex Corporation, 463 F.2d 1042 (2d Cir. 1972); Sticker Industrial Supply Corp. v. Blaw-Knox Co., 405 F.2d 90 (7th Cir. 1968); Hovlid v. Asari, 305 F.2d 747 (9th Cir. (1962).

That is not the problem in the present case, where the Ganiaris IV application was amended, albeit belatedly, to refer to the first and second applications in the chain. The problem in the present case is that the second application in the chain (Ganiaris II) was never effectively amended prior to its termination to refer to the first application (Ganiaris I). Ganiaris IV could not obtain the benefit of Ganiaris I directly because it was not filed before termination of proceedings on Ganiaris I. Ganiaris IV could not obtain the benefit of Ganiaris I through Ganiaris II because Ganiaris II never had the benefit of Ganiaris I. The purported amendment of Ganiaris IV, designed to amend Ganiaris II to refer to Ganiaris I, is another example of Struthers' agility

in practicing before the Patent Office, but was a nullity.[22]

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22. Struthers' flexibility in seeking its ends is illustrated by the manner in which it dealt with the facts. The supplemental oath of Neophytos Ganiaris filed May 10, 1971 in Ganiaris IV (Ex. 7, p. 43) represented the Ganiaris II application (Serial No. 512,365) to be his "original application". That being so, it is difficult to conceive how Ganiaris IV could be accorded the benefit (Footnote #22 cont.,) of any earlier application, and specifically the benefit of the earlier-filed Ganiaris I application.

Nothing daunted, however, a month after the issue fee had been paid, Ganiaris signed a declaration which was filed June 16, 1971 in Ganiaris IV (Ex. 7, p. 41). The declaration, which newly recited that Ganiaris II is a continuation-in-part of Ganiaris I, conflicts with Ganiaris' sworn statement, in the supplemental oath filed just a month earlier, that Ganiaris II was his original application.

See also page 41 of Struthers' supplemental answers to Nestle's First Interrogatories where Struthers' states, with respect to the '034 patent that: (i) the invention of claims 1-4 was conceived on or about December 23, 1963 (after the Ganiaris I filing date); (ii) the invention of claim 5 was conceived in April, 1964; and (iii) the invention of each claim was reduced to practice on December 8, 1965. The latter date is the

(Footnote #22 cont.,)
date when the Ganiaris II application was filed -- two years after the November 4, 1963 Ganiaris I filing date.

See Clover Club Foods Co. v. Gottschalk, 178 USPQ 505, 508 (C.D. Cal. 1973), which involved a situation identical to that at hand, except that the applicant lacked the ingenuity to remedy the non-reference deficiency by seeking to amend a terminated application:

> In a series of four patent applications, the fourth application in the series is not entitled to the benefit of the filing date of the first application in the series, if the second application in the series does not contain a specific reference to the first application in the series. 35 U.S.C. § 120.

Thus, the '034 patent is entitled to the benefit of the Ganiaris II December 8, 1965 filing date. It is not entitled to the benefit of the Ganiaris I November

4, 1963 filing date.

b. The British Application Filing Date

Having concluded that the '034 patent is entitled to a December 8, 1965 filing date, it is unnecessary to decide whether under 35 U.S.C. § 119 it is entitled to the July 15, 1966 filing date of British application 31831/66.

In paragraphs 22 through 31 of his affidavit, Ganiaris sought to show that the various prior art references relied upon by Nestle did not disclose one or another of the features of the '034 patent claims. However, an examination of these references, including those referred to in connection with the discussion of '295 prior art, the '522 patent, and certain other patents discussed below, demonstrates that any differences in the '034 patent are obvious within the meaning of § 103.

Because of the similarity between the claims of the '034 and '295 patents, the prior art discussed under Part III F (2) above is applicable also to invalidate the '034 patent. The substantial similarity of the claims is readily seen from the following side-by-side comparison of claim 1 of each patent.

'295 Patent Claim 1	'034 Patent Claim 1
1. A process for preparation of concentrates of coffee which comprises:	1. A process for the preparation of a concentrate of coffee
(a) extracting roast ground coffee with hot water to form an aqueous extract having 15-30% dissolved solids therein;	from a liquid containing about 24% coffee solids which comprises
(b) partially freezing said mixture of ice and more concentrated extract having at least 20% dissolved solids therein;	(a) partially freezing aqueous coffee extract in at least two serially connected crystallizer passes to form a mixture of about 20-30% by weight

	of ice and a concentrated extract,
(c) separating said ice from said more concentrated extract by centrifuging under conditions whereby a portion of said more concentrated extract adheres to said ice;	(b) separating said ice by centrifugation from said mixture under conditions whereby a portion of said concentrated extract adheres to said ice,
(d) reducing the amount of said more concentrated extract adhering to said ice to a finite amount less than 5% by weight of said ice by washing and centrifuging;	(c) reducing the amount of said concentrated extract adhering to said ice by centrifuging and by washing in the centrifuge with addition of wash water or melted ice
(e) melting said ice to a solution containing dissolved extract which is less than 5% by weight of said melted ice; and	(d) melting the ice to form a dilute solution which contains the coffee which had been adhering to the ice and
(f) recovering coffee solids from said melted	(e) recovering coffee solids from said melted ice.

As the comparison shows, the '034 starting concentration of 24% falls

within the 15-30% range of '295. By concentrating a 24% extract one necessarily obtains a concentrate containing the more than 20% solids specified in '295. The only point of difference is that '034 does not quantify the solids remaining on the ice after washing as being less than 5%; but, as shown above, the whole point of washing is to bring the residual solids to such a low level.

There is thus no distinction of substance between claim 1 of each patent. As described below, the minor features added by the dependent claims of the '034 patent were known and do not impart any patentable or unobvious distinction.

Claims 7 and 12 of the Ganiaris IV application (which, after amendment, became claims 1 and 5 of the '034 patent), were rejected for double

patenting over the '295 patent (Ex, 7, p. 34). Struthers acquiesced in the rejection, and amended claim 7. The question arises whether the amendments added anything of patentable significance. I conclude that the prior art shows the features which were inserted by amendment.

The Ganiaris '522 patent (Tab K) describes at column 3, lines 22-46, freeze concentrating a coffee solution containing "about 24%" coffee solids (25% is disclosed) to form a mixture of ice and a concentrated extract having 37% solids.[23] The ice is separated in centrifuge 32, and the amount of concentrated extract adhering to the ice is reduced by washing the ice. Figure 2 of the '522 patent depicts wash line 80

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23. The importance to Struthers of its efforts to obtain the benefit of the '522

(Footnote #23 cont.,)
filing date for its '034 patent is demonstrated by this discussion of prior art (see Part H(1)(a)). If Struthers had been able to obtain for its '034 patent (the Ganiaris IV application) the benefit of the filing date of the '522 patent (Ganiaris I application), the '522 patent could not have been used against the '034 patent as prior art. However, having attempted (albeit improperly) to obtain the benefit of the '522 filing date, Struthers admits that the '034 "invention" was disclosed in the '522 patent. 35 U.S.C. § 120.

spraying water onto the ice in the centrifuge (see also col. 3, lines 45-50). The separated ice is slurried with a 13.4% coffee solution, which melts some of the ice, and the slurry is recycled to crystallizer 39 (see col. 2, lines 50-56), thereby recovering the solids. The separated extract is further concentrated in serially connected crystallizer 64. The filing date of the '522 patent is earlier than any invention date Struthers has alleged for the '034

patent.[24] Moreover, by filing a terminal disclaimer in Ganiaris IV to overcome the rejection for double patenting over the '522 patent, Struthers admitted that the '034 subject matter is patentably indistinct from that claimed in '522.

The 1946 Kellogg patent 2,408,260 (Tab B) describes freeze concentration of coffee extract, with return of the separated ice to the soaking vessel 10 used to extract the ground coffee (see col. 3, lines 28-33 and Fig. 1 of the drawing), thereby recovering the solids from the melted ice. Melting of the ice and recovery of solids therefrom is also

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24. Struthers' supplemental answer to Nestle Interrogatory 62 asserts a conception date of December 23, 1963 for claims 1-4 of the '034 patent and April, 1964 for claim 5. Reduction to practice on December 8, 1965 (which is the filing date of Ganiaris II) is asserted for all claims.

shown in the 1959 Berger patent 2,896,418 (Tab E) at col. 3, lines 4-6. Lund patent 3,205,078, filed 1961 and issued 1967 (Tab I), describes freeze concentration of coffee and other comestibles, and teaches melting the separated ice and using it for extraction to minimize losses (col. 3, lines 12-17). The feature of forming about 20-30% by weight of ice in the concentrated extract is shown by Svanoe patent 3,285,021 (Tab L), filed 1962 (see col. 4, lines 5-6, teaching 10-30% ice), and by Pike patent 3,285,022 (Tab M), filed January, 1963 (see col. 3, line 32, teaching 25% ice). Svanoe patent 3,347,058 (Tab N), filed July, 1963, describes multi-stage freeze concentration of coffee extract with about 20-40% ice formed in each stage (col. 5, line 24), and teaches that the ice crystals can be washed with water or

dilute extract, the washings being recycled (col. 5, lines 7-9). The 1961 Cole patent 2,967,778 (Tab G), describes freeze concentration of beverage liquids and washing of the ice with water derived from thawing ice crystals (col. 6, lines 20-24).

As to claim 2 of the patent, mixing the ice with feed solution is shown in the Ganiaris '522 patent and Svanoe 3,347,058, discussed above.

The claim 3 features of melting the ice and using it to wash other ice and recycling the wash liquid into the feed is shown in the Ganiaris '522 patent. It describes routing ice via pipe 82 and pump 83 to melter condenser 16 (col. 3, lines 48-53), where the ice is melted. The melted ice passes through pipe 86 and pump 87 to centrifuge 47, which it enters through pipes 80 and 81 (col. 4, lines 6-14). The water entering centrifuge 47

through line 80 is used to wash the separated ice (col. 3, lines 48-50). As shown in Fig. 2 and described in the lower portion of column 3, wash water entering through line 80 is sprayed onto the ice crystals and collected in compartment 131 to be drawn off through pipe 80', as shown in Fig. 1. As is seen from Fig. 1, line 80'runs down to join pipe 34 and thence through pump 35 its contents are fed to first crystallizer 41. Cole patent 2,967,778 (Tab G) also shows melting ice and using it as wash liquid. Recycling of the washings to the feed is also shown in Svanoe 3,347,058 (Tab N), as note Example 1, col. 4, line 60, through col. 5, line 9, and in Pike 3,285,022 (Tab M) at col. 3, lines 33-36.

As to the claim 4 feature of recycling some of the concentrated coffee solution into the feed, the '522 patent describes recycling a portion of

concentrated solution leaving centrifuge 47 via pipe 37 to the feed contained in line 30 (col. 3, lines 4-9; and see Fig. 1). The claim 5 feature of recovering coffee solids from the wash water is shown in the '522 patent by recycling them to crystallizer 41, as discussed above, and in Svanoe patent 3,347,058.

Any differences distinguishing the '034 patent from the prior art would have been obvious at the time the invention was made to a person having ordinary skill in the art and, consequently, Nestle is entitled to summary judgment of invalidity of the '034 patent under 35 U.S.C. § 103.

I. Invalidity of the '034 Patent under § 112

Nestle urges that the '034 patent fails to contain a full, clear and exact description of the subject matter it claims and that the patent is accordingly

invalid under the first paragraph of 35 U.S.C. § 112.

Claim 1 of the '034 patent (and all of the other claims as well, for they are all in dependent form) requires "preparation of a concentrat of coffee from a liquid containing about 24% coffee solids" by partial freezing and separating ice.

According to Nestle this is not the same invention described in the specification. There is no written description in the specification of partially freezing (i.e., freeze concentrating) a liquid containing 24% coffee solids. According to the specification the feed solution entering at pipe 11 contains 26% solids; after dilution that stream (in pipe 13) contains 13% to 24% solids; it is then enriched by mother liquor (entering through pipe 28) to contain some unspecified percentage of

solids, less than 30%. Thus, according to Nestle, there is no written description in the specification of freeze concentrating a 24% solids solution and thus no written description in the specification of the subject matter claimed in the '034 patent.

The Third Circuit has cautioned against being "unduly parsimonious" in the application of § 112, Rengo Co. Ltd. v. Molins Machine Company, Inc., Docket Nos. 80-2556 & 80-2557 (3d Cir. July 21, 1981), Slip Op. at 28. This approach is particularly appropriate when dealing with a patent in a field where the prior art is fulsome and the skill in the art is very high. In such a situation "skill in the art can be relied upon to supplement that which is disclosed as well as to interpret what is written". Rengo Co. Ltd., supra, at 28.

Therefore, I will deny Nestle's

motion for summary judgment on § 112 grounds.

J. Conclusion

For the reasons set forth above Nestle's motion for summary judgment of invalidity of the Ganiaris '295 patent will be granted on the grounds of non-compliance with 35 U.S.C. § 112 and obviousness over the prior art, 35 U.S.C. § 103, and Nestle's motion for summary judgment of invalidity of the Ganiaris '034 patent will be granted on the grounds of obviousness over the prior art, 35 U.S.C. § 103.[25]

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25. At the time of the hearing on Nestle's motions directed to the Ganiaris patents I reserved decision on Nestle's contention that the '034 patent is invalid by reason of double patenting. In view of my conclusion that the '034 patent is invalid by reason of double patenting. In view of my conclusion that the '034 patent is invalid for obviousness under § 103 it is unnecessary to address this contention.

IV. The Reimus Patents

Nestle moved for summary judgment of invalidity, and/or unenforceability of Reimus and Saporito patents ("Reimus") 3,381,302 (the '302 patent), 3,449,129 (the '129 patent), 3,632,353 (the '353 patent), and 3,474,723 (the '723 patent) on the following grounds:
Nestle's motions directed to the Ganiaris patents I reserved decision on Nestle's contention that the '034 patent is invalid by reason of double patenting. In view of my conclusion that the '034 patent is invalid for obviousness under § 103 it is unnecessary to address this contention.

1. The four Reimus patents are invalid for failure to prosecute in the manner required by law.[26]

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26. Nestle alleged three kinds of violations of Patent Office Rules

(Footnote #26 cont.,)
committed by Struthers while prosecuting the Reimus applications: (i) There were numerous interviews with the examiner after which Struthers failed to make of record the reasons presented warranting favorable action. 37 C.F.R. § 1.133(b). (ii) When prosecuting the Reimus II and Reimus IIIA applications (hereinafter defined) Struthers violated 37 C.F.R. § 1.133(a) by interviewing the examiner to discuss patentability before there had been an official action. (iii) Struthers failed to comply with the requirements of 37 C.F.R. § 1.111 that supposed errors in the examiner's action be distinctly and specifically pointed out in writing, that the applicant respond in writing to every ground of rejection and that the applicant specifically point out how the language of the claims patentably distinguishes them from the prior references. It is clear from the record that Struthers' conduct in prosecuting the Reimus applications was deficient at least with respect to items (i) and (iii). However, at the June 16, 1981 hearing I denied Nestle' motion for summary judgment on this ground because the remedy for violation of Patent Office Rules is equitable in nature, requiring a weighing of all the circumstances, Monsanto Co. v. Rohm & Haas Co., 456 F.2d 592 (3d Cir.), cert. denied, 407 U.S. 934 (1972), and therefore not readily susceptible to summary judgment.

2. The applications upon which the four Reimus patents issued became abandoned by operation of law.

3. The '129 and '353 patents are invalid because they claim subject matter given up during prosecution of the application for the '302 patent.

4. The '129, '353 and '723 patents are invalid by reason of double patenting.

5. The '129, '353 and '723 patents are invalid and void for want of legally adequate oaths or declarations.[27]

6. The four Reimus patents are invalid by reason of prior use and sale.

7. The four Reimus patents are invalid under § 112.

8. The four Reimus patents are invalid over the prior art.

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27. At the june 16, 1981 hearing I ruled that the deficiencies in Struthers' prosecution of the applications (legally inadequate oaths or declarations) to which Nestle referred as a ground for summary judgment were highly technical in nature, and I denied the motion for summary judgment on that ground.

9. The four Reimus patents are invalid and unenforceable by reason of Struthers' withholding material facts from the Patent Office.

After the hearing on the Group III motion I reserved decision on all of the above grounds except grounds 1 and 5. This opinion deals with the reserved matters.

A. Description of the Patents

1. Reimus '302 Patent

The '302 patent is for 'Freeze Concentration of Coffee Extract". Its abstract of disclosure reads: "A process is described for the concentration of comestible liquids by partially freezing ice therefrom and separating the ice from the concentrated liquid. Prior to freezing the ice the liquid is chilled to

a temperature no lower than about 32°F. which is near to, but substantially above, the freezing point and the liquid is prefiltered so that waxes and similar material are removed before the ice is formed."

The specifications recite that this invention relates to an improvement in the process of preparation of concentrated comestible liquids and liquid extracts with which the reader of this opinion should by now be familiar. The problem to which the invention directs itself arises from the fact that during the freezing process, which is followed by formation of ice and the separation of the ice from the concentrated extract, a gummy or waxy material is often precipitated from the solution prior to the ice formation. This material collects on the centrifuge basket and clogs it. The invention

consists of a process for preparing the extract, cooling the extract to a temperature above that at which ice forms so as to precipitate the gummy, waxy material, removing the gummy, waxy material and then proceeding with the freeze concentration steps. When this practice is followed, "the centrifuge basket does not become plugged with precipitated tars and waxes and the separation and washing processes are facilitated in their efficiency".

The claims of the patent read:

We claim:

1. In a process for the concentration of liquid coffee extract which forms insoluble precipitate at above the temperature at which ice forms therein and which contains therein about 10 to 40% dissolved solids comprising partial freezing of said liquid extract to form ice and concentrated liquid extract, the improvement which comprises precooling said liquid extract to a temperature between about 32 to 45°F. to precipitate insoluble material therefrom, storing said liquid extract in said temperature range

until sufficient precipitate occurs without substantial adverse flavor effect, removing said insoluble material from said liquid extract, subsequently subjecting said liquid extract to reduced temperature to form ice therein, and separating ice from said concentracted extract.

2. The process of claim 1 wherein said coffee extract contains from 15 to 30 percent coffee solids.

3. The process according to claim 1 in which the liquid is kept under agitation during the precooling and precipitation to prevent adherence of wax and gum to the heat transfer surface.

2. Reimus '129 Patent

The '129 patent is for a "Concentration Process". Its abstract of disclosure reads: "A process is described for the concentration of coffee liquid by partially freezing ice therein and separating the ice from the concentrated liquid. Prior to freezing the ice, the liquid is chilled to a temperature range from about 45° to 80°F.

to form a mixture of waxes and similar material and liquid coffee extract and the mixture is treated so that the waxes and similar material are removed from the liquid before the ice is formed." The two differences between the '302 and '129 patents disclosed in the abstracts are (i) the products involved, the '302 patent being applicable to all comestible liquids (including coffee) and the '129 patent being directed to coffee liquid, and (ii) the temperatures for removing the gummy, waxy material, the '302 patent calling for a temperature no lower than about 32°F., which is substantially above the freezing point (32° to 45°F. according to the claims), and the '129 patent calling for a temperature of 45° to 80°F.

The specifications of the '129 patent are the same as the specifications of the '302 patent. The claims of the '129

patent read:

What is claimed is:

1. In a process for the concentration of liquid coffee extract, which forms insoluble precipitate material at above the temperature at which ice forms therein and which contains therein about 10 to 50% dissolved solids, comprising partial freezing of said liquid extract to form ice and concentrated liquid extract, the improvement which comprises: chilling said liquid extract to a temperature between about 45° and 80°F. to induce formation of insoluble precipitate material therein; holding said liquid extract in said temperature range until after insoluble precipitate material forms; removing said insoluble precipitate material from said liquid extract; subsequently subjecting said liquid extract to reduced temperature to form a mixture of ice and concentrated extract; and separating ice from said concentrated extract.

2. The process according to claim 1 in which the liquid extract is kept under agitation during holding and formation of precipitate.

3. The process according to claim 1 in which the coffee extract to be treated contains about 15% to 30% dissolved solids.

4. A process according to claim 1 in which ice is separated from coffee extract by centrifugation.

5. A process according to claim 1 in which insoluble precipitate is separated from coffee extract by centrifugation.

6. A process for preparing a dehydrated coffee beverage product soluble in water from a liquid coffee extract containing from about 10% to about 50% by weight dissolved solids, some of which form insoluble matter at a temperature above the temperature at which ice forms in the extract, including the steps of:

(a) chilling the extract to a temperature range of from about 80°F. to about 45°F. and maintaining the extract in the temperature range for a period of time sufficient to precipitate at least a portion of the insoluble matter;

(b) removing the precipitated insoluble matter formed within the range of about 80°F. to about 45°F. from the extract; and

(c) then subjecting the extract to dehydration.

3. Reimus '353 Patent

The '353 patent is for "Removal of Tar and Waxes in Freeze Concentration of Coffee". Its abstract reads: "A process for making coffee concentrates is

described in which liquid coffee of high solids concentration is chilled within a temperature range of 80° to 36°F. and precipitates formed within this temperature range are removed prior to freeze concentration by forming slush ice in the coffee, separating the ice from the coffee and then treating the ice so separated to recover residual coffee." According to the abstract this invention relates to coffee alone and prescribes a temperature range of 80° to 36°F. in which to precipitate, recover and remove the offending gummy, waxy material. With minor variations (e.g., Col. 4, lines 15-38), the specifications of the '353 patent are identical to the specifications of the '302 and '129 patents.

The claims read:

We claim:

1. A process of the concentration of a liquid aqueous coffee extract which when chilled produces a precipitate which is insoluble in said extract above the temperature at which ice forms therein, comprising: chilling a feed liquid extract containing 24 percent by weight dissolved solids to a temperature between 80° and 36°F. to form a precipitate therein; holding said liquid extract at a chilled temperature below 80°F. until precipitate forms; separating said precipitate and said extract; subsequently concentrating said extract by subjecting said liquid extract to reduced temperature to form a mixture of ice and concentrated liquid extract; separating ice from said concentrated extract; and treating the ice to recover residual coffee solids therefrom.

2. The process according to claim 1 in which the chilled extract is agitated at temperatures between 80°F. and 36°F.

3. A process according to claim 1 wherein the chilled extract is held at a temperature between 36°F. and 45°F.

4. A process according to claim 1 wherein the chilled extract after removal of precipitate is freeze concentrated to remove part of the water present in the extract, as ice, the ice is washed and coffee solids are recovered from the washings.

5. A process as claimed in claim 1

wherein separation of precipitate is effected by filtration above 36^0F.

6. A process as claimed in claim 1 wherein separation of precipitate is effected by centrifugation above 36°F.

7. A process as claimed in claim 1 wherein the precipitate free liquid extract is concentrated in a single-stage crystallizing process.

8. A process as claimed in claim 1 wherein the precipitate free liquid extract is concentrated in a single-staged crystallizing process.

9. A process as claimed in claim 1 wherein the precipitate free liquid extract is concentrated in a tubular scraped surface heat exchanger.

10. A process as claimed in claim 1 wherein ice is separated from the liquid in a centrifuge and the ice is washed while in the centrifuge.

11. A process as claimed in claim 10 wherein washing liquid is treated to recover coffee content therefrom after washing the ice.

12. A process as claimed in claim 1 in which the extract is agitated while forming a mixture of ice and concentrated extract.

4. Reimus '723 patent

The '723 patent is entitled "Beverage

Apparatus". Its abstract reads: "A system of apparatus for removing water from coffee and tea extract by first chilling to form a suspension of solids in the liquid is provided which removes the solids from the liquid and thereafter forms a mixture of ice and liquid. The ice is separated in a centrifuge and is washed. Apparatus for removing the solids before forming ice prevents plugging of the centrifuge." The '723 patent purports to disclose an apparatus which performs the process disclosed in the Reimus '302, '129 and '353 patents. The drawing which accompanies the '723 patent is the same as the drawing which accompanies the other Reimus patents (with two variants in the nomenclature).

The specifications differ from those of the other three Reimus patents in that an apparatus is described rather than a process. The claims read as follows:

What we claim is:

1. An apparatus system for concentration of aqueous liquid coffee or tea extract comprising: precooling and holding means, a precipitate separation device, a first line conducting cooled extract from said precooling and holding means to said separation device, a tubular ice crystallizer, a second line conducting separated extract from said separation device to said tubular ice crystallizer, a centrifuge ice separator, a third line conducting a slurry of ice in a concentrated liquid extract to said centrifuge ice separator from said crystallizer, a fourth line conducting concentrated extract from said centrifuge ice separator, means removing ice from said centrifuge ice separator, and means for washing said ice.

2. An apparatus system according to claim 1 including means agitating said extract in said precooling and holding meads.

3. An apparatus system according to claim 1 in which means are provided for washing said ice in said centrifuge.

4. An apparatus system according to claim 1 including means in said tubular ice crystallizer agitating said extract.

5. An apparatus system according to claim 1 in which said ice crystallizer is a scraped surface crystallizer.

B. Prosecution of the Reimus Applications

Four applications for patent, all of which were owned and prosecuted by Struthers, are pertinent to the Group III motion which is directed to the dewaxing patents described above. The first application (Reimus I; Serial No. 511,173; Ex. 8) resulted in patent 3,381,302. The second application (Reimus II; Serial No. 763,276; Ex. 9) resulted in patent 3,449,129. The third application (Reimus III-B; Serial No. 828,419; Ex. 10) resulted in patent 3,632,353. The fourth application (Reimus IV; Serial No. 763,851; Ex. 11) resulted in patent 3,474,723.

1. THE REIMUS I APPLICATION (The '302 Patent)

In December, 1965 Struthers filed the Reimus I patent application in the name

of its employees Richard G. Reimus and Anthony Saporito.[28] The alleged invention, and the discovery on which it is based, are set forth in Reimus I (and in the '302 patent) in the following words:

> To improve the flavor of the soluble coffee, it has been often proposed to remove substantial amounts of water in the extract by partially freezing the extract and separating the resulting pure ice crystals from the concentrated extract.
> * * *

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28. Struthers' supplemental answer to Nestle Interrogatory 59 states that Mr. Reimus directed operation of Struthers' mobile (railroad flatcar) freeze concentration unit and that he also worked on the freeze concentration system sold to General Foods. According to Struthers' answer to Coca-Cola Interrogatory 26, Reimus' employment was terminated in August, 1968 "for lack of work". The interrogatory answers further state that Mr. Saporito had functioned as a maintenance employee, mail clerk, blueprint room helper, and laboratory technician, and that he worked with and reported to Mr. Reimus.

However, when coffee extract is cooled to near its initial freezing point, a gummy or waxy solid material often precipitates from solution prior to ice formation. This wax or tar is carried along with the ice crystals and coffee extract into the centrifuge and collects on the centrifuge basket, eventually plugging the basket and preventing the complete separation of ice from concentrated extract.

This problem of the precipitation of insoluble materials in the coffee extract is not a problem exclusive of coffee extracts alone, but is also encountered in the preparation of other concentrated extracts of comestible materials. Thus, the process of this invention is also applicable to the preparation of concentrated extracts of such comestible materials as tea, grape juice, apple juice, beer and orange juice.

* * *

The objects of this invention are accomplished by a process which comprises preparing a comestible liquid or liquid extract, cooling the liquid to precipitate material insoluble at the temperature at which ice forms therein, removing insolubles from the resultant mixture and then subjecting the insoluble-free mixture to concentration by partial freezing of water therefrom.

(Ex. 8, pp. 4-6; '302 patent at cols. 1-2.)

The specification also states that the formation and precipitation of tars, gums and waxes is time-dependent and may require "from a few seconds to several or many hours", "depending on the nature of the extract" (Ex. 8, p. 9). The specification also warns that continued exposure of coffee extract to low temperature "will also cause the formation of a non-waxy particulate precipitate", which "should be avoided because it is tantamount to degradation of the coffee extract" (Ex. 8, p. 9). Neither the examples nor any other part of the specification, however, specify how long one should hold a coffee extract at any given temperature in order to precipitate undesirable "tarry" substances without also losing desirable constituents and degrading the extract. The examples do not mention time.

The originally filed claims were not

limited to coffee. Claim 1 had no top temperature limitation. Dependent claim 6 specified a temperature of 32° to 80°F.; dependent claim 7 (which was cancelled before examination of the application; Ex. 8, p. 24) specified a temperature of 32° to 45°F. None of the claims made any mention of how long the liquid should be cooled (Ex. 8, pp. 15-16).

On May 1, 1967, Mr. Drucker petitioned to accelerate examination of the application (Ex. 8, p. 24). He stated that a search of prior art patents had been made but enclosed a copy of only one patent (the 1946 Frederickson patent 2,410,157; Ex. 8, p. 26; Tab D), which was "deemed most closely related to the subject matter encompassed by the claims".

In the petition Mr. Drucker acknowledged that the prior art Frederickson patent taught "removal of

waxy substances from the coffee", and that it taught such removal prior to concentration of the extract. In fact, the Frederickson patent teaches "removing the waxy substances of varying densities from a liquid coffee extract [by] subjecting the extract to a period of quiescence in a cooling zone at a low non-freezing degree of temperature to permit the relatively heavier waxy substances to settle to the bottom of the extract, [then] separating the liquid extract from the heavier waxy substance * * * " (Claim 14, foot of col. 11; Ex. 8, p. 31). A temperature of 33° to 34°F. -- which is within the range claimed in the '302 patent -- is suggested (Col. 6, line 50; Ex. 8, p. 28).

The examiner cited the 1924 Zorn patent 1,507,410 (Tab A), under 35 U.S.C. § 102 in the first official action (Ex. 8, p. 32) as "fully meeting" the claims.

Zorn teaches cooling coffee extract without freezing it, and then removing the "undesirable elements" which are "thrown into suspension by the cooling of the liquid". After removing the precipitated substances, the liquid is frozen into a "mushy state" and the ice crystals are removed, preferably by centrifugation, to obtain a concentrated coffee solution. Zorn thus taught "dewaxing", followed by freeze concentration, as early as 1924.

The examiner, Mr. Greenstein, also rejected other of the claims over Zorn under § 103 because:

> Zorn . . . treats coffee extract in exactly the manner claimed. . . . It is considered that the solids values [of the extract] recited by the instant claims impart no patentable significance to the claims, because their determination is well within the purview of one having ordinary skill in this art, particularly in the light of the Zorn teaching. Case law has long established the doctrine

> that determination of optimum proportions, as in the instant claims, is not patentable.
>
> (Ex. 8, pp. 32-33.)

Other claims were rejected as unpatentable over Smith patent 3,102,036 (Tab G), filed 1960, which shows multi-stage freeze concentration of coffee and other beverages, in view of Zorn and the 1941 Rolle patent 2,234,063 (Tab C), which cools tea and other extracts, suitably to between 34° and 40°F., and then removes the resultant precipitate (see p. 4, right col., lines 11-15).

The examiner also cited the 1957 Tarasch patent 2,804,389 (Tab E), which states that coffee (beans) contain a fat called coffee wax, which is soluble in hot or boiling water and that a very considerable amount of such wax is liberated into brewed coffee; and the examiner also cited the 1946 Frederickson

patent (supra).

In response to the official action Mr. Drucker cancelled several of the dependent claims, including claim 6 which recited a temperature range of 32° to 80°F., and limited all of the remaining claims by amending claim 1 to specify a temperature range of 32° to 45°F. (Ex. 8, p. 36). The accompanying remarks urged that this temperature range (which had been specified in claim 7, the claim cancelled in the petition to accelerate examination) distinguished the amended claims from the Zorn reference because:

> In ZORN, at column 2, page 1, it is noted that the temperature at which the prechilled liquid is filtered is as low as possible without actually freezing. Unlike this method of ZORN, it has been found that the prechilled material should be filtered at a temperature of from 32° to 45°F in order to avoid flavor degradation. This temperature is clearly above the lowest possible temperature above the freezing point.

(Ex. 8, p. 36-37.)

The remarks also relied on Reimus' disclosure that a 30% solids coffee extract freezes at about 27°F.

In furtherance of the above-quoted assertion that a temperature of 32° to 45° F. was important to avoid flavor degradation, Mr. Drucker also represented that the Reimus disclosure at page 6, lines 21-27, "pointed out that most temperatures below the preferred range should be avoided because of degradation of the coffee extract (Exh. 8, p. 37)." That assertion is not correct. The paragraph of the specification to which he referred states that "continued exposure" to low temperature causes degradation, and that exposure "sufficient to cause" such degradation should be avoided. The restriction is thus on duration of exposure, and not on the temperature to which the extract is exposed. There is nothing in that

passage to suggest that temperature below the claimed range (i.e., below 32°F.) should be avoided. Indeed, the Reimus application states that one embodiment of the invention comprises cooling the extract to below the freezing point, so that ice is formed along with the insoluble precipitate (Ex. 8, p. 8).

Despite the examiner's admonition that extract solids values impart no patentable significance to the claims (original claim 5 recited 15 to 30% solids in the extract), Mr. Drucker amended Claim 1 to recite the broad range of 10 to 40% solids and urged (Ex. 8, p. 36) that because of the effect on "flavor quality" the claims thereby avoided Zorn. He represented that the amendment found support in the Reimus application at page 4, line 20, but that disclosure is antithetical to, rather than supportive of, the 10 to 40% range as

promoting flavor quality. That passage states that while the solids content of the extract may be as high as 40 to 50%, high solids content often lowers the flavor quality, and a solids content of 10 to 30% is accordingly preferred.

There is nothing in Zorn which excludes treating extract within the extract solids range of 10 to 40%, or which restricts the Zorn disclosure to solids contents below 10% or above 40%.

In a further effort to distinguish Zorn, Mr. Drucker argued that "very detailed instructions" are required to preserve the quality (flavor) of the coffee extract, which Zorn allegedly does not provide (Ex. 8, p. 37). Such "detailed instructions" are not, however, provided by Reimus, either in the specification or in the claims. The specification, and the examples, are devoid of any guidance as to how long

precooling should continue to remove unwanted "tars" without also degrading the extract by removing desirable constituents.

Following submission of the amendment, there was a telephone interview between Mr. Drucker and Examiner Greenstein. As a result, independent claim 1 was cancelled by the examiner and replaced by claim 13 (which became claim 1 of the '302 patent). Claims 5 and 12 were made dependent from claim 13 (and became claims 2 and 3 of the '302 patent). Claim 13 was limited to coffee extract, but continued to specify a solids content range of 10 to 40% and a temperature range of 32° to 45°F. A new clause was added to claim 13:

> . . . storing said liquid extract in said temperature range [32°-45° F.] until sufficient precipitation occurs without substantial adverse flavor effect.

(Ex. 8, p. 40.)

The Patent Office issued its Notice of Allowance and Issue Fee Due on March 14, 1968.

2. THE REIMUS II APPLICATION (The '129 Patent)

On September 27, 1968 Struthers filed the Reimus II application.[29] Reimus II claimed a 45° to 80°F. extract cooling range -- the temperature range Struthers had given up during the prosecution of the '302 patent by cancelling claim 6 (which claimed a range of 32° to 80°F.) and amending to insert a 32° to 45°F. range in all of the claims.

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29. Before issuance of the '302 patent, Struthers had filed Reimus application Serial No. 718,510 on April 3, 1968. It (Footnote #29 cont.,) issued as patent 3,432,308, which claims tea and is not in suit. The Reimus II application claimed "priority" of Serial No. 718,510 and the Reimus I application.

Struthers interviewed the examiner before he had acted in the Reimus II application. There was no official action and, as a result, the file wrapper of the '129 patent does not contain the examiner's objections and rejections. Neither does the record reflect how the claim amendments Struthers made following the interview (Ex. 9, pp. 20-21) were thought to establish patentability and overcome the prior art. The remarks accompanying the amendment provide only the statement that "the subject application was discussed" at the interview (Ex. 9, p. 21)

Struthers filed, concurrently with the amendment, a "Petition to Make Special" (Ex. 9, p. 22) seeking expedited issuance of the patent. Within a month of receipt of the petition in the examining group the examiner made several additional changes to the claims and

allowed them (Ex. 9, p. 27) -- following an ex parte telephone interview. The official record contains no written explanation of how the amended claims were thought to be patentable or distinguish over the prior art.

The file wrapper of the '129 patent does not reflect the business which was transacted during Struthers' ex parte negotiations with the examiner. Six prior art patents and the Sivetz text were apparently considered by the examiner (Ex. 9, p. 29), but it is impossible to tell what representations were made by Struthers to secure allowance of the claims over that prior art.

Following the first interview Struthers submitted a terminal disclaimer, executed by Mr. Drucker in his capacity as Vice President of counterdefendant Struthers Scientific.

It gave up that part of the 17-year term of the '129 patent which extended beyond the expiration date of the '302 patent.

The Reimus II application issued as the '129 patent on June 10, 1969.

3. THE REIMUS III APPLICATION (The '353 Patent)

The "Reimus III" application is, in reality, two applications, contained in a single file wrapper ("Reimus I and "Reimus III-B"). Rather than completing prosecution of the first application (Reimus III-A), a so-called "streamlined continuation" application (Reimus III-B) was filed. The III-B application used the specification and declaration of the first application, hence the file wrapper of the first application was transferred to and is contained in the file wrapper of the second application.

On the same day Struthers filed its

Reimus II application for the '129 patent it also filed the Reimus III-A application (Serial No. 763,217; Ex. 10; face of file wrapper appears at Ex. 10, p. 3). Whereas the '302 patent claimed a temperature range of 32° to 45°F. and Reimus II claimed 45° to 80°F., Reimus III-A claimed a temperature of 32°F. down to the point at which ice begins to form in the extract (Ex. 10, p. 16).

As in Reimus II, Struthers interviewed the examiner on Reimus III-A before the examiner had acted on the case and then submitted an amendment changing the claims without revealing the negotiations which occurred at the ex parte interview (Ex. 10, p. 20). Thereafter, a terminal disclaimer over the '302 patent was submitted (Ex. 10, p. 26), along with a petition to make special (i.e., to accelerate issuance) (Ex. 10, p. 23). Those papers were filed

the same day as the parallel papers in Reimus II.

The examiner issued an action rejecting the new claims (Ex. 10, p. 29). All the claims were rejected under § 112, and they were also rejected under § 103 over portions of the 1963 Sivetz text (Tab L), which teaches that freeze concentration coagulates tarry substances from coffee extract, and also teaches the expedient of settling to remove "tars".

The examiner also cited Cottle patent 3,362,178 (Tab J), filed 1964, which describes cooling an aqueous food or beverage to precipitate insolubles which form at a temperature near the ice-forming temperature, removing the insolubles, and then freeze concentrating the insoluble-free mixture (col. 2, lines 26-32). Cottle also teaches cooling the mixture to form a minor portion of ice crystals in the mixture along with the

precipitate (col. 2, lines 41-52).

Faced with that art, Struthers gave up trying to claim cooling to a temperature between 32°F. and the ice point. Struthers no longer pressed for rapid issuance of a patent; nor did it reply to the official action. Instead, Struthers converted the III-A application into a new, "streamlined continuation" (Application Serial No. 828,419 filed May 12, 1969; Reimus III-B; Ex. 10 at p. 33).

The claims of Reimus III-B (Ex. 10, pp. 34-36) specified a temperature range of 36° to 80°F. (see claim 1, line 6) or, in the case of dependent claim 3, 36° to 45°F.

The examiner pointed out in his first action that there was inconsistency between what was formerly being claimed and what was currently being claimed (Ex. 10, p. 38).

The claims of Reimus III-B

essentially blanketed the '302 and '129 patents:

'302 patent:	32° to 45°F.
'129 patent:	45° to 80°F.
Reimus III-B	36° to 80°F.[30]

The examiner did not reject the claims for double patenting in the first official action, but they were rejected for double patenting over the '302 and '129 patents in the second action (Ex. 10, p. 47). In response, Mr. Drucker submitted a terminal disclaimer as to both prior patents (Ex. 10, p. 54).

In his first action, Examiner Greenstein rejected all claims of Reimus III-B over the 1963 Sivetz Coffee Processing Technology text (Tab L) in

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30. The Reimus specification does not disclose or suggest that 36° has any significance. 36° to 80°F. merely happens to be a range identified at the end of Example 2, along with an extract solids range of 12 to 32% (Ex. 10, p. 15).

view of the Cottle patent 3,362,178, filed January, 1964 (Tab J), and either the 1964 Svanoe Canadian patent 699,247 (Tab K), or the McKay patent 3,216,833, filed March, 1962 (Tab H). After pointing out the pertinence of the cited art, the examiner concluded, "it is considered that freeze concentrating coffee extract in the manner claimed herein would be fairly suggested by the cited references" (Ex. 10, pp. 38-39).

No changes to the claims were made in response to the examiner's rejections. Instead, Mr. Drucker argued (Ex. 10, p. 43) that the individual references did not completely anticipate the claims; he did not address the combination of references upon which the rejection was based (other than to argue the combination of Sivetz with Svanoe).

The next official action (Ex. 10, p. 46) rejected the claims for double

patenting, as mentioned above, and also cited Struthers' Ganiaris patent 3,283,522, filed November, 1963 (Tab I). All claims were rejected on Ganiaris '522, which shows cooling coffee extract to 50°F., and then to about 35°F., centrifuging the extract, and freeze concentrating the clarified extract, as well as washing the separated ice.

In addition, the examiner took exception to Struthers' designation of the prior applications as divisions of the parent case (no requirement for restriction or division having been made in Reimus I or in intermediate Serial No. 718,510; see 35 U.S.C. § 121). The declaration (oath) of Reimus III-A, which also served as the declaration of the streamlined continuation III-B case, was therefore defective; and the examiner demanded that a new oath (declaration) be provided (Ex. 10, p. 47). In response to

that requirement Mr. Drucker represented that a new supplemental oath would be filed upon indication of allowable claims (Ex. 10, p. 50). In fact, however, no new oath or declaration was ever provided.

In response to the rejection over Ganiaris '522, Mr. Drucker amended to change the 10 to 30% solids content range recited in the claims to read 24 to 32%, and argued that this change rendered the claims patentable because Ganiaris allegedly showed an initial extract concentration of only 10 to 13.4% solids (Ex. 10, p. 50). The initial extract solids content is expressly stated in the Ganiaris patent to be "purely exemplary" (Tab I, at col. 6, line 55), and none of the '522 patent claims is limited to any particular extract solids content.

The examiner thereupon entered a FINAL rejection. He stated there was no support in the application for the newly

claimed range of 24 to 32% solids (Ex. 10, p. 53). All claims were again rejected on prior art, the examiner saying:

> The [Ganiaris '522] reference teaches that his feed is a '10% solution of roasted coffee bean extract in water', Sivetz (p, 481, Volume 1, lines 1-5) [Tab L] is relied upon to show that tars and waxes are removed from coffee extracts upon centrifugation. When the feed extract of Ganiaris is cooled in pre-cooler 12 from 120°F to 50°F and cooler 23 down to 35°F, tars and waxes are inherently formed especially in view of the temperature and are removed from solution when the cooled feed is passed to the centrifuges for washing the ice therein. Liquid removed from the centrifuge is thus free of tars and waxes and sent to the crystallizers for freeze concentration.

No written reply to the final rejection (dated January 4, 1971) and no written request for reconsideration was ever filed by Struthers, even though an extension of time to May 4, 1971 for response was secured (Ex. 10, p. 61). Mr. Drucker did have an oral telephone

interview with the examiner, wherein certain changes "were approved" (Ex. 10, p. 58).

The record does not reflect why or how the "approved changes" led the examiner to regard the claims as allowable. The only change in the claims was that the solid content range of 24 to 32% was changed to 24% (Ex. 10, p. 58).

The list of references cited (Ex. 10, pp. 59-60) includes several items of prior art which were not cited of record in the prosecution of the prior cases. The file wrapper does not reflect whether these were discussed privately or what representations were made by Struthers concerning them.

The '353 patent issued on January 4, 1972.

4. THE REIMUS IV APPLICATION
(The '723 Patent)

The Reimus IV application (Ex. 11) was filed September 30, 1968, five months subsequent to issuance of the '302 patent and three days after the Reimus and III-A applications were filed. In Reimus IV, Struthers for the first time presented claims to apparatus. Reimus IV is designated a "division" of intermediate Serial No. 718,510, which is, in turn, designated a "division" of Reimus I. No requirement for division or restriction was made during prosecution of those applications. Reimus IV contains disclosure not found in the prior applications. It also omits parts of the earlier disclosure (e.g., the examples). The prior applications did not describe any apparatus as forming part of Reimus' invention.

By a preliminary amendment before

action, received in the Patent Office mail room on May 12, 1969 (Ex. 11, p. 20), claims 11 and 12 were added to the application. The date when that amendment was received in the examining group does not appear from the file, and those claims were not mentioned in the first official action mailed June 12, 1969 (Ex. 11, p. 22), The action was evidently written by the examiner on or about April 30, 1969, the date which appears in handwriting on the Notice of References cited (Ex. 11, p. 24).

A handwritten note on the preliminary amendment (Ex. 11, p. 21) reflects that the attorney was in for an interview on June 20, 1969 and that claims 11 and 12 were considered. That interview was never acknowledged by Struthers, nor did Struthers make of record the discussion which was had.

The first official action objected to

the drawing as inadequate and also rejected the claims as unpatentable over prior art. Claim 1 was rejected under 35 U.S.C. § 102 as fully met by either of two prior art patents, the 1924 Zorn patent 1,507,410 (Tab A), or the 1927 Zorn patent 1,636,890 (Tab B). The remaining claims were rejected under § 103 over the earlier Zorn patent (Ex. 11, p. 23).

Struthers responded by cancelling eight claims, amending each of the remaining claims and adding a new claim. The accompanying remarks contained only a general allegation that the claims were patentable over Zorn, but Struthers did not specifically point out how the language of the claims patentably distinguished them from the reference, and did not point out the patentable novelty which the claims were thought to present in view of the state of the art

disclosed by the cited reference, and did not point out how the amendments avoided the reference. Nevertheless, the examiner purported to allow the claims -following a telephone interview (Ex. 11, pp. 29-30). In addition, the examiner entered numerous changes and additions to the specification, and even more changes and additions to the claims, all at the request of the attorney during the telephone interview. Once again, the reasons presented as warranting favorable action were not filed, and it was not pointed out in writing how the amendment to the claims avoided the prior art.

The '723 patent issued on October 28, 1969.

C. Prior Sale -- Nestle's and Struthers' Contentions

1. Facts Relied upon by Struthers

Struthers relies upon the following paragraphs from Ganiaris' affidavit to substantiate its assertion that there are factual issues which preclude summary judgment of invalidity of the four Reimus patents by reason of prior sale or use.

42. The sale contract dated August 12, 1964 did not incorporate any equipment relating to dewaxing.

43. In March 1965, General Foods agreed to permit the installation of such equipment in the Struthers' freeze concentration plant and share the cost with Struthers. Prior to January 1965, General Foods did not even appreciate that a dewaxing operation was necessary.

44. To the best of my knowledge,

dewaxing disclosures were not offered for sale to General Foods before January or February, 1965.

2. Facts Relied upon by Nestle

In support of its prior sale contention Nestle relies in part upon the factual material adduced on the same issue as it related to the Muller patents (Part II of this opinion). This dealt with Struthers' publication, offering for sale and sale to General Foods of Struthers' "Frecon" freeze concentration process. In addition, Struthers' supplemental answer to NestIe Interrogatory 50 asserts that General Foods infringed Reimus '302, '129 and '723 patents through use of freeze concentration equipment and systems sold by Struthers to General Foods in 1964 and 1965, and used by General Foods allegedly

in excess of the scope of its license from Struthers.

Nestle also relies upon other answers by Struthers to Nestle interrogatories, deposition testimony of Struthers' employees and memoranda prepared by Struthers' employees. They will be described below.

Struthers' answer to General Foods Interrogatory 6 relied on activities in May, 1964 to establish a date of invention for the '302 patent (DDX 38, Tab A, pp. 8-10). That was the time when Struthers' mobile flatcar FreCon unit was used at General Foods' Winterhaven plant to freeze concentrate coffee extract. Anthony Saporito, Reimus' co-patentee on each of the four patents here under consideration, was present on that occasion. He later testified that when "tars and waxes" were found plugging the centrifuge screens upon processing coffee

extract in the flatcar FreCon unit at Winterhaven, cheesecloth was obtained and used to filter out the precipitate from the coffee solution prior to freeze concentration. Mr. Saporito's testimony continued:

> To my knowledge, when we opened up that centrifuge and found the tars, I told Mr. Reimus we couldn't operate with the tars. I believe Mr. Reimus talked to Maxwell House representatives, and then what transpired after that, the conversations or anything of that nature, I don't know about.
>
> But eventually it was decided to pass the coffee through the cheesecloth.
>
> Q. Do [sic] you participate in the origination of that concept?
>
> A. Just on the manual labor part.
>
> Q. Was it you that suggested the use of the cheesecloth to Mr. Reimus?
>
> A. No.
>
> Q. Were you present when the decision was made to use or to try to obtain cheesecloth?
>
> A. No. I was in the vicinity, of course, but I was working, I had

duties to perform.

Q. Do you know who suggested the use of cheesecloth to screen the coffee extract of any foreign [sic] material?

A. I don't know who suggested it.

* * *

Q. You were just told that a decision had been made to try to use cheesecloth in order to rectify the problem of plugging. Is that correct?

A. I don't know whether I was told or not, but what I remember is Mr. Jacobs [of General Foods] coming down with an armful of cheesecloth and we started to filter.

Q. And that was it plain and simple?

A. That is as far as I am concerned.

Q. No one told you why the cheesecloth was going to be used?

A. Well, it was obvious -- it was for obvious reasons, to remove the tars or waxes that formed.

Q. Had you ever seen anyone use cheesecloth in Warren, Pennsylvania [Struthers' laboratory] in 1963?

A. Not in 1963, no.

Q. When was the first time you had ever seen cheesecloth used? May we agree that this was the first time?

A. This was the first time, yes.

(Saporito Transcript, pp. 432-433; on file as DDX 16, Tab 8.)

Robert Hedrick, then head of Struthers' Warren laboratories and the immediate supervisor of Reimus and Saporito, was asked about that episode by Struthers' patent counsel. In his April 20, 1965 response Hedrick wrote:

> When wax was first encountered, it was obvious to all concerned that cooling the coffee and filtering or centrifuging would remove the wax, * * * . I would say that last summer [1964] when we ran the coffee here in the Warren lab that it was obvious to both Maxwell House and SSIC [Struthers] engineers that cooling the feed would remove the wax; but that no one knew how cold it had to be, how long it had to be held, or if it would continue to precipitate in the crystallizer.
>
> * * *
>
> This is the story I have. I realize it is not very helpful.
>
> [DDX 16, Tab 14; emphasis supplied.]

Mr. Hedrick also testified in the General Foods litigation concerning his

memorandum:

Q. In other words it was obvious that these precipitated insolubles could be separated from the solution; is that correct?

A. Yes.

Q. By filtering and centrifuge?

A. Yes.

Q. And this was obvious to all, according to your statement?

A. Yes.

Q. Whom do you mean by 'all'?

A. The various people concerned with the experimental run.

Q. Who would that be, Mr. Reimus, Mr. Saporito?

A. Mr. Muller, myself.

Q. Mr. Muller?

A. Yes.

Q. Anyone else?

A. It would be -- it would just have been obvious to anyone who saw the operation.

(DDX 16, Tab 8, pp. 5381-5382.)

Struthers' answer to General Foods' Interrogatory 6 (sworn to by Mr. Drucker

in his capacity as an officer of Struthers, DDX 38, Tab A) describes the use of Struthers' flatcar "FreCon" unit at General Foods' Winterhaven plant to freeze concentrate coffee extract in May, 1964, as follows:

> (i) Coffee extract was cooled in 40 gallon fibre packs in a refrigerated car. These were too heavy to lift, each one containing about 30 gallons of coffee extract and thus weighing about 300 pounds. Mr. Saporito removed the cooled extract from each fibre pack with a bucket and poured the contents of the bucket onto cheese cloth stretched over the top of a drum having a capacity of about 30 to 40 gallons, thereby filtering out precipitated insoluble material from the cooled coffee extract. When the level of each pack dropped sufficiently so that the pack was light enough to lift, Mr. Saporito, with the help of some others present, poured the remaining contents of the pack onto the cheese cloth thereby filtering out precipitated insoluble material from the remainder of the cooled coffee extract. The thus dewaxed coffee extract was then freeze concentrated in the Struthers Mobile FreCon plant at Winterhaven, Florida. Witnesses present were Messrs. Simon, Clyne, Jacobs and Pflugger [sic] of GF and possibly,

Reid Sutherland, a Birdseye representative.

Martin Gotterman, a General Foods employee, described the operation of Struthers' mobile flatcar freeze concentration plant. In a memorandum dated September 23, 1964, he wrote:

> To operate the system, it was necessary to prefilter both IMH and IY extracts to remove waxy solids which would blind the centrifuge screen, ultimately causing it to tear.
>
> (Item 19, Struthers' Production Documents, Group I.)

As a result of this experience, he recommended in the memorandum (p. 5) that filtering means be installed on the coffee extract feed lines of the FreCon system General Foods had by that time contracted to purchase from Struthers.

The foregoing (most of which constitutes sworn statements of Struthers' officers or employees) shows

the untruthfulness of Ganiaris' statement contained in the affidavit opposing the present motion that "Prior to January 1965, General Foods did not even appreciate that a dewaxing operation was necessary."

D. Abandonment of the Four Reimus Applications

Relying upon 35 U.S.C. § 133 as implemented by Patent Office Rule § 1.135 (prosecution of an application to save it from abandonment "must include such complete and proper action as the condition of the case may require"), Nestle urges that all four Reimus patents must be deemed to have been abandoned.

Nestle can point to numerous instances in the prosecution of each of these applications where Struthers did not take such complete and proper action

as the condition of the case required within the appropriate time limits; in fact, Struthers never took complete and proper action on those occasions because the examiner was willing to accept a lesser response.

The deficiencies included repeated interviews with the examiner after office actions without the filing of written statements of the reasons presented to the examiner as warranting favorable action, and repeated failures to point out, in response to an examiner's action, how the language of the claims patentably distinguishes them from the references.

Notwithstanding these obvious failures on Struthers' part to respond to official actions of the Patent Office in the manner required by the Patent Office Rules, the Patent Office itself accepted Struthers' responses as sufficient to justify the issuance of the patents in

question. In these circumstances, for the reasons set forth in Part III D of this opinion dealing with the contention that the '295 patent was abandoned as a matter of law, I shall deny Nestle's motion for summary judgment of invalidity of the Reimus patents on this ground.

E. Invalidity of the '129 and '353 Patents for Claiming Subject Matter Previously Given Up

Claim 1 of the Reimus I application (upon which the '302 patent issued) contained no limitation as to the solids content of the extract to be treated or the temperature during "dewaxing" (Ex. 8, p. 15). Dependent claim 6 specified a "dewaxing" temperature of 32° to 80°F. In response to rejection on prior art made in the first official action, Struthers amended claim 1 to insert an extract solids content of 10 to 40% and a

temperature range of 32° to 45°F. Claim 6 was cancelled.

It was urged in Mr. Drucker's accompanying remarks that both the inserted solids content range and the inserted temperature range distinguished from the prior art over which the claims had been rejected. Claim 1 was subsequently rewritten as application claim 13 (which became claim 1 of the '302 patent), and the solids content and temperature ranges were carried over into that claim.

On September 27, 1968 Struthers filed its Reimus II application as a division of the Reimus I application (which had issued as the '302 patent the previous June). Reimus II claimed a 45° to 80°F. extract cooling range -- the exact temperature range Struthers had given up during the prosecution of the '302 patent as described above.

The Reimus III-A application was also filed on September 27, 1968. Its prosecution was aborted as described in Part B(3) of this opinion and the Reimus III-B application was filed as a continuation of Reimus III-A. Its claims specified a temperature range of 36° to 80°F. or, in the case of dependent claim 3, 36° to 45°F. The application purported to be a division of the Reimus I application. Thus it, too, claimed a temperature range given up in the Reimus I prosecution.[31]

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31. Nestle notes that the filing of the Reimus II and Reimus III-A applications occurred about two weeks after Struthers learned, through discovery in the General Foods litigation, that General Foods' extract cooling temperature was above the 32° to 45°F. range specified in the '302 patent, thus providing Struthers with a motive to regain the 32° to 80°F. range it had given up in the prosecution of the Reimus I application. This is one of a number of instances in which Nestle relates Struthers' steps in the prosecution of the various applications pertinent to the present action to the litigation between General Foods and

(Footnote #31 cont.,)
Struthers. Such relationship might be pertinent to some issues in this case, but I do not think they bear upon the resolution of the summary judgment motion.

The Supreme Court stated, in Schriber-Schroth Co. v. Cleveland Trust Co., 311 U.S. 211, 220-222 (1940):

> It is a rule of patent construction consistently observed that a claim in a patent as allowed must be read and interpreted with reference to claims that have been cancelled or rejected, and the claims allowed cannot by construction be read to cover what was thus eliminated from the patent. [Citations omitted.] The patentee may not, by resort to the doctrine of equivalents, give to an allowed claim a scope which it might have had without the amendments, the cancellation of which amounts to a disclaimer. [Citations omitted.] The injurious consequences to the public and to inventors and patent applicants if patentees were thus permitted to revive cancelled or rejected claims and restore them to their patents are manifest. [Citations omitted.]
>
> * * *
>
> * * * But in any case the Patentee, having acquiesced in their rejection, is no longer free to gain the supposed advantage of the rejected claims by a construction of the

> allowed claims as equivalent to them. [Citation omitted.]

That principle of patent law applies equally whether the patentee attempts to recapture that which he has given up to secure a patent by contending that the claims he secured are entitled to a broadened construction, or by obtaining a second patent on the subject matter he gave up. C-Thru Products, Inc. v. Uniflex, Inc., 262 F. Supp. 213 (E.D.N.Y. 1966), aff'd on other grounds, 397 F.2d 952 (2d Cir. 1968).

In the C-Thru case, as here, the broadest claim of the original application did not recite a certain feature, which was subsequently inserted by amendment to overcome a rejection on prior art. The Court pointed out:

> Under the doctrine of file wrapper estoppel, these claims cannot be enlarged to cover those which were previously eliminated from the patent by the amendment. As explained by Judge Learned Hand in Keith v.

> Charles E. Hires Co., 2 Cir. 1940, 116 F. 2d. 46, 47 'The theory of the "estoppel" as it is called, is that, by assenting to the cancellation of the claim and by amending it, the applicant has abandoned it as it stood.' [Citations omitted.] Plaintiffs are, therefore, estopped from asserting that the patentability of the handle bag rests upon any other feature. [Citation omitted.]"
>
> (262 F. Supp. at 216-217.)

The patentee in C-Thru, like Struthers here, then proceeded to obtain a second patent claiming the subject matter he had given up during the prosecution of the first application (and, also like Struthers, obtained the second patent by filing a terminal disclaimer over the first patent). The Court stated:

> Consequently, the scope of the single claim in the second Laguerre patent was more encompassing than any of the four claims in the first Laguerre patent. Thus the file wrapper estoppel applicable to the first Laguerre patent as to the criticality of the location of the fasteners was avoided by the issuance of a patent upon the second Laguerre application.
>
> It is fundamental that a patentee, in

> seeking a subcombination patent, cannot enlarge the scope of the parent patent by omitting a restriction contained therein and thus avoid file wrapper estoppel, [Citations omitted.] The rejection by the Examiner of the second Laguerre application, however, was not predicated upon file wrapper estoppel but upon the ground of double patenting. The Examiner withdrew this rejection upon the filing of a terminal disclaimer. Congress never intended, by the enactment of 35 U.S.C.A. §253, to permit the use of a terminal disclaimer for the purpose of avoiding file wrapper estoppel. Only when the real objection to granting the second application is an extension of a monopoly is such a terminal disclaimer proper. But double patenting and file wrapper estoppel must not be confused, since a terminal disclaimer may under certain circumstances be employed to avoid the objection of the former but never the effect of the latter. Sterling Varnish Co. v. Louis Allis Co., E.D. Wis. 1957, 149 F.Supp. 826; Application of Robeson, 1964, 331 F.2d 610, 51 CCPA 1271.
>
> (262 F. Supp. at 217.)

Summary judgment of invalidity of the second Laguerre patent was therefore granted. See also Jamesbury Corporation v. United States, 518 F.2d 1384, 1397-8

(Ct. Cl. 1975).

Moreover, even a timely filed reissue application under 35 U.S.C. § 251 would have been to no avail to Struthers; for it is well established that one cannot recapture by reissue the subject matter which was given up during prosecution of the original patent. See Dobson v. Lees, 137 U.S. 258, 265 (1890):

> Hence the reissue cannot be permitted to enlarge the claims of the original patent by including matter once intentionally omitted. Acquiescence in the rejection of a claim; its withdrawal by amendment, either to save the application or to escape an interference; the acceptance of a patent containing limitations imposed by the patent office, which narrow the scope of the invention as at first described and claimed; are instances of such omission.

See also Shepard v. Carrigan, 116 U.S. 593 (1886):

> Where an applicant for a patent to cover a new combination is compelled by the rejection of his application by the patent office to narrow his

> claim by the introduction of a new element, he cannot after the issue of the patent broaden his claim by dropping the element which he was compelled to include in order to secure his patent.
>
> (116 U.S. at 597.)
>
> If an applicant, in order to get his patent, accepts one with a narrower claim than that contained in his original application he is bound by it. If dissatisfied with the decision rejecting his application, he should pursue his remedy by appeal. Under the circumstances of this case, the inventor could not even get a reissue based on the broader claim which she had abandoned. [Citation omitted.] Much less can she, in a suit brought to restrain its infringement, enlarge her patent by argument, so as to cover elements not falling within its terms, and which she had explicitly abandoned.
>
> (116 U.S. at 598.)

The same principle was enunciated by the Court of Appeals for this Circuit in AMP Inc. v. Burndy Corp., 332 F.2d 236 (3d Cir. 1964):

> Moreover, under the doctrine of file wrapper estoppel, the patentee, having acceded to the rejection of his original claims as lacking invention over Smith and having

> amended his claims to include relative resistence to cold plastic flow as a definitive characteristic distinguishing his device from Smith, cannot now be heard to claim patentable novelty in any other disclosure of his original patent or the reissue based upon it. [Citation omitted.]
>
> (332 F.2d at 238.)
>
> We conclude, therefore, that the original Watts patent * * * was invalid for want of invention. It necessarily follows that the re-issue patent in suit is also invalid, since it cannot avoid the definitive and essential limitations upon which the claim of invention over Smith was predicated in the original patent.
>
> (332 F.2d at 239.)

Struthers advances several arguments to counter the seemingly necessary conclusion that it could not recapture in the '129 and '353 patents that which it had given up in order to avoid prior art in the prosecution of the '302 patent.

First, Struthers urges that giving up a claim is a matter of intent, which raises a factual issue. That contention is unsound. File wrapper estoppel does

not depend upon state of mind. Certain consequences flow as a matter of law from certain actions of the applicant. Here it cannot be disputed that in prosecuting the '302 patent application Struthers did things which bring the doctrine of file wrapper estoppel into play.

Second, Struthers urges that the '129 and '353 patents stem from the '302 patent as divisions or continuations and are, therefore, entitled to the filing date of the '302 patent. The logic of this contention escapes me. True, if '129 and '353 are proper divisions or continuations of '302 they are entitled to a December 2, 1965 filing date; but file wrapper estoppel is applicable whether one is dealing with the same or different patents, parent or child patents.

Struthers cites Crown Cork & Seal Co., Inc. v. Ferdinand Gutmann, Inc., 304

U.S. 159 (1938), in support of its position. That case, however, is not in point. It dealt with, among other things, a true abandonment question, whether an applicant who eliminated a disclosure in an application not to overcome a prior art rejection but in order to prosecute it in a divisional application intended to abandon the claim. Since the case did not deal with the cancellation of a portion of a claim in order to meet an examiner's prior art rejection, it did not involve a file wrapper estoppel situation.

A patentee connot recapture the subject matter which he gave up during prosecution in order to secure the allowance of his patent. The applicant has the right to challenge the rejection, and to appeal it to the Board of Appeals and thence to the Courts, if he disagrees with the rejection; but once having

acquiesced in the rejection and having amended the claims to overcome it, he is bound by that acquiescence. Exhibit Supply Co. v. Ace Patents Corp., 315 U.S. 126 (1942).

Nestle is entitled to summary judgment of invalidity on the ground that the '129 and '353 patents seek to recapture all or part of the subject matter given up during prosecution of the application for the '302 patent.

F. Invalidity by Reason of Prior Sale

If valid, the '302, '129 and '353 patents are entitled to a filing date of December 2, 1965, the date when the application for the parent '302 patent was filed. Nestle urges that the '723 apparatus patent is not entitled to a December 2, 1965 filing date, but for the

purposes of this Part IV (F) I am assuming that it is entitled to the benefit of that date. In order to sustain its § 102(b) prior sale or use contention, Nestle must show that there is no issue of fact as to a sale or use of a device or process substantially identical to those claimed in the Reimus patents, and that such sale or use was more than one year prior to December 2, 1965, i.e., prior to December 2, 1964.

Ganiaris' statement contained in his affidavit in opposition to the motion to the effect that "prior to January 1965, General Foods did not even appreciate that a dewaxing operation was necessary" is patently false. Struthers' own officers have stated otherwise under oath and in memoranda (see Part IV(C) of this opinion). In May of 1964, when Struthers was demonstrating its "FreCon" unit to

General Foods, it became obvious that it was necessary to remove the tars which plugged the centrifuge during the freeze concentration process. Mr. Hedrick and Mr. Drucker, both officers of Struthers, have stated under oath that removal of the tars was accomplished at that time by cooling the extract and then filtering it through cheesecloth to remove the wax before freeze concentrating. This, of course, was the essence of the Reimus patents. Ganiaris' affidavit cannot create a factual issue as to these events by stating generally that prior to January, 1965 General Foods did not appreciate that a dewaxing operation was necessary. Some of the other data upon which Nestle relies to establish prior sale or use encompasses a period starting before and ending after the critical date -- December 2, 1964 -- and, therefore, it cannot be relied upon to establish this

defense. Further, it must be assumed that Ganiaris' other sworn statements are true, namely, that the August 12, 1964 sales contract with General Foods did not incorporate dewaxing equipment and that dewaxing disclosures were not offered for sale to General Foods before January or February, 1965.

The question becomes whether the indisputable facts as to the devising and use of dewaxing procedures in May, 1964, when Struthers was demonstrating its FreCon unit, and General Foods' subsequent (pre-December 2, 1964) decision to use such procedures in connection with the freeze concentration equipment purchased from Struthers, is an invalidating sale or use under § 102(b).

Struthers' answer to General Foods Interrogatory 6 (sworn to by Mr. Drucker in his capacity as an officer of Struthers, DDX 38, Tab A) describes the

event as follows:

> (i) Coffee extract was cooled in 40 gallon fibre packs in a refrigerated car. These were too heavy to lift, each one containing about 30 gallons of coffee extract and thus weighing about 300 pounds. Mr. Saporito removed the cooled extract from each fibre pack with a bucket and poured the contents of the bucket onto cheesecloth stretched over the top of a drum having a capacity of about 30 to 40 gallons, thereby filtering out precipitated insoluble material from the cooled coffee extract. When the level of each pack dropped sufficiently so that the pack was light enough to lift, Mr. Saporito, with the help of some others present, poured the remaining contents of the pack onto the cheese cloth thereby filtering out precipitated insoluble material from the remainder of the cooled coffee extract. The thus dewaxed coffee extract was then freeze concentrated in the Struthers Mobile FreCon plant at Winterhaven, Florida. Witnesses present were Messrs. Simon, Clyne, Jacobs and Pflugger [sic] of GF and possibly Reid Sutherland, a Birdseye representative.

Moreover, Martin Gottesman, a General Foods employee, described the operation of Struthers' mobile flatcar freeze concentration plant. In a memorandum dated September 23, 1964, he wrote:

> To operate the system, it was necessary to prefilter both IMH and IY extracts to remove waxy solids which would blind the centrifuge screen, ultimately causing it to tear.
>
> (Item 19, Struthers' Production Documents, Group I.)

As a result of this experience he recommended in the memorandum (p. 5) that filtering means be installed on the coffee extract feed lines of the FreCon system General Foods had by that time contracted to purchase from Struthers. Filtering is merely one method of removing insoluble precipitate material from liquid extract claimed in the Reimus patents. The '129 patent, col. 4, lines 49-51, states that "pressure filtration techniques * * * well known to the art, may be employed to separate the extract from the precipitate". The Reimus expedient was an obvious adjunct to what Struthers acknowledges was on sale and

had been sold. The 36° to 80°F. temperature range specified in the claims of the '353 patent (which was not in suit against General Foods) reads on any temperature which would infringe the '129 patent, and most of the range of the '302 patent. The recitation of coffee extract having 24% solids in the '353 claims (a value within the range claimed in the '302 and '129 patents) does not save that patent from invalidity; see Timely Products Corp. v. Arron, 523 F.2d 288, 302 (2d Cir. 1975):

> Complete readability of the claim on the thing offered [for sale] is not required because whatever is published (or on sale) more than one year prior to the filing of a patent application becomes part of the prior art over which the claim must be patentable. [Citation omitted.]

Consequently, I conclude that Nestle is entitled to summary judgment of invalidity of the four Reimus patents under 35 U.S.C. § 102(b) on the grounds

of prior offer of sale, sale or use.

G. Invalidity under § 112

Nestle asserts numerous instances in which the four Reimus patents fail to meet the three requirements of the first paragraph of 35 U.S.C. § 112 -- written descriptions, enablement and best mode. Application of DiLeone, 436 F.2d 1404 (CCPA 1971).

According to the statement of the alleged invention contained in the patents, the coffee extract is chilled to near the freezing point so that waxes, tars and gums which are soluble in the hot extract are precipitated therefrom (Ex. 8, p. 8). The specification also warns that in some coffee extracts continued exposure to low temperature will also cause formation of a non-waxy particulate precipitate which should be

avoided, because exposure sufficient to cause that precipitate is tantamount to degradation of the coffee extract (Ex. 8, p. 9).

The Reimus specifications do not, however, describe how one is to know whether a given coffee extract should be subjected to the "dewaxing" treatment they describe, and Struthers has represented that not all extracts require "dewaxing" or should receive such treatment.

The Reimus applications do not state what temperatures should be used, or avoided, in "dewaxing".

The Reimus specifications likewise do not specify the duration of the "dewaxing" treatment. The Reimus teaching is that the extract may be held at the low temperature "for from a few seconds to several or many hours" before the waxes, tars and gums are removed (Ex.

8, p. 9). That exceptionally broad teaching furnishes no guidance, particularly as the specification further warns against exposure for a long enough time to precipitate desirable materials and degrade the extract.

In addition, the specification does not provide guidance as to how one may differentiate between the two types of precipitate, or how one may recognize the precipitate which is said to degrade the extract (it is referred to only as a "non-waxy particulate precipitate").

Nestle offers other examples which I need not recite of the manner in which it asserts the Reimus patents do not meet the requirements of the first paragraph of § 112.

Nestle also asserts that the Reimus patents fail to meet the requirements of the second paragraph of § 112.

I have concluded, however, that the

entire subject matter of the Reimus patents involves very simple (and I later find obvious) concepts. The skill in the applicable art is very high. (Note how easily the persons working on the "FreCon" unit in May, 1964, were able to solve the problem of gummy, waxy material clogging the centrifuge during the freeze concentration process.) There can be no doubt that one skilled in the art (and also one having only negligible skill in the art) can adjust the various factors of temperature, concentration of extract, and holding time to obtain concentrated coffee extract having the desired flavor. As Ganiaris stated in paragraph 26 of his affidavit, "It is common practice in the industry to control every step of the coffee manufacturing process by 'empirical' (meaning, usually, panel taste) tests, whereby one can establish the quantity of precipitate that affects

taste for a specific extract." Given the ease with which those skilled in the art can fill the voids in the Reimus patents, it cannot be said that these voids require invalidation of the patents under 35 U.S.C. § 112. Rengo Co. Ltd. v. Molins Machine Company, Inc., supra. The same consideration, however, has an important bearing on the question of obviousness of the Reimus patents.

H. Invalidity of the Reimus Patents over Prior Art - Obviousness

Nestle urges invalidity of the four Reimus patents both on § 102(b) grounds and § 103 grounds. Since I have concluded that Nestle is entitled to summary judgment of invalidity on the basis of obviousness, I have not ruled on the § 102(b) prior published art contentions. The laws relating to the

criteria for determining obviousness, the presumption of validity, and the appropriateness of summary judgment are set forth in Part II(E) of this opinion dealing with the Muller patents.

The prior art relevant to all four Reimus patents and the manner in which it anticipates and renders obvious the alleged inventions of the Reimus patents is as follows:

The 1924 Zorn patent 1,507,410 (Tab A) describes a process in which liquid coffee extract is cooled "to a temperature near the freezing point" (p. 2, lines 110-111), filtered to remove the materials thrown into suspension by cooling of the liquid, and then freeze concentrated. Zorn thus discloses the invention described by Reimus, et al., who similarly state that the coffee extract "is first chilled to near the freezing point so that waxes, tars and

gums which are soluble in the hot extract are precipitated therefrom (Ex. 8, p. 8).

Reimus states that "minimum temperatures of 40°F. and below may be employed in the process of this invention". Temperatures within Reimus' preferred 32° to 45°F. range must perforce be "near the freezing point".

Zorn also teaches that the several steps he discloses "should be carried out as rapidly as possible", and that it is preferable "to remove as much of the matter in suspension as possible before concentrating" (p. 2, top of left col.). Zorn's disclosure is equally as good as Reimus' disclosure in respect of duration of exposure to temperatures near the freezing point.

The 1946 Fredrickson patent 2,410,157 (Tab D) also removes waxy substances from coffee extract by cooling, and suggests temperatures of 33° to 34°F., which fall

within the range set forth in the '302 patent.

The 1941 Rolle patent 2,234,063 (Tab C) teaches removing gummy material from tea extract by cooling and filtering off the precipitate that forms upon standing. A temperature of 34° to 40°F. is suggested (p. 4, top of right col.). The Reimus patents state that the problem of precipitation of insoluble materials is not a problem exclusive to coffee extracts alone, but is also encountered in the preparation of other concentrated extracts of comestible materials, and acknowledge that the process of the invention is also applicable to tea, grape juice, apple juice, beer and orange juice. The application for the '302 patent originally claimed treatment of tea as well as coffee. Both the '302 and '353 temperature ranges read upon Rolle's suggested temperatures of 34° to 40°F.

The 1959 Seltzer patent 2,891,865 (Tab F), which was not cited by the Patent Office, also describes cooling a tea extract to precipitate insolubles, which are removed prior to dehydration of the extract. It is stated in column 3 that the extract is cooled preferably below 85°F.; but not below 45°F., in order not to detract appreciably from the desired flavor quality. Holding the extract at such temperatures for about half an hour is usually sufficient, but the extract may be held for a longer time, up to three hours. Excessive removal of solids may lead to an inferior product. Lower temperatures result in precipitation and removal of greater amounts and different proportions of the various ingredients in the extract.

The temperature ranges of the '129 and '353 claims thus read on Seltzer, who also teaches avoidance of flavor

impairment by regulating the time of exposure to the lowered temperature. Claim 6 of the '129 patent, which calls for subsequent "dehydration", also reads on Seltzer's disclosure of drying the extract after removal of precipitate.

These prior art patents demonstrate the lack of novelty and invention in the subject matter described and claimed in the Reimus patents. The principle of cooling an aqueous comestible extract such as coffee extract and holding it at various temperatures within the ranges claimed by Reimus was shown in the art, and available for all to use.

Zorn anticipates both the '302 and '353 patents; the Reimus specifications establish that temperatures below 40°F. are "near the freezing point". The 45° to 80°F. temperature range of the '129 patent also reads on Zorn, 45°F. being within Reimus' preferred temperature

range. The elasticity which is imparted to the claims by the term "about" increases the extent of overlap.

The solids content ranges described in the claims do not save them from invalidity on grounds of obviousness. Zorn is unrestricted in terms of extract solids content, and the Reimus patents do not suggest that the dewaxing expedient is affected by the solids content of the extract. Reimus merely suggests that carrying out the extraction process to the point where high solids contents are achieved may lower the flavor quality of the extract. For this reason, Reimus prefers a range of 10 to 30 percent solids in the extract. The 10 to 40% solids range of the '302 patent and the 10 to 50% solids range claimed in the '129 patent exceed that preferred range, and hence do not define extracts which are preferred for reasons of flavor, as

described by Reimus. The '353 patent does not contain an extract solids range, but, rather, specifies 24% solids, a value inserted into the claims by Examiner's Amendment (Ex. 10, p. 58) without any indication of how or why it might affect patentability. Although 24% is within the range of 10 to 30%, it does not define a preferred flavor range and cannot be linked to Reimus' disclosure of that range. Rather, 24% solids merely happens to be the value set forth in Examples 1 and 2, which do not attribute any significance or advantage to it.

Application of Clinton, et al., 527 F 2d. 1226 (CCPA 1976), was discussed in some detail in Part II(C) of this opinion in connection with the Muller patents dealing with the combination of freeze concentration and freeze drying.

As pointed out there, General Foods filed a patent application in the names

of Clinton, et al. (effective filing date May 5, 1965) which also claimed "dewaxing" of coffee extract:

> 8. The process of claim 1 wherein the coffee extract is chilled to between 33° and 45°F. and held for a period sufficient to cause insoluble sediment to form in the extract and then separating said sediment from the extract prior to freeze concentration.

Following final rejection of the Clinton, et al claims and affirmance of the rejection by the Patent Office Board of Appeals, General Foods appealed to the Court of Customs and Patent Appeals.

The CCPA affirmed the rejection of the "dewaxing" claims in view of Cottle patent 3,362,178 (Tab J), filed January, 1964. Application of Clinton, et al., 527 F.2d 1226, 1228 (CCPA 1976):

> Cottle et al. disclose that freeze concentration of food products and beverages generally may result in the formation of a sediment which can be removed by cooling and

> clarification. Although Cottle et al. do not disclose sediment formation in coffee extract in particular, we think it would have been within the ability of a worker of ordinary skill in the art aware of Cottle et al. to subject a coffee extract to gradual cooling and to remove any resultant sediment prior to freeze concentration.

The CCPA thus ruled that "dewaxing" of coffee extract prior to freeze concentration -- the subject matter of Struthers' four Reimus patents -- is unpatentable for obviousness. The CCPA's ruling was made on the basis of Cottle without considering the prior art, discussed above, which specifically describes "dewaxing" coffee extract.

On the basis of the undisputed facts in the record, I conclude that the Reimus patents are invalid under § 103. The prior art patents discussed above show various temperatures within the various ranges set forth in the Reimus patents. Reimus does not advance the art, or make

any contribution to it. The claims do not define any inventive or patentable advance but, rather, define a subject matter which is obvious in view of the prior art.

The apparatus claimed in the '723 patent is merely that which will carry out the processes described in the prior art. There is nothing novel about any of the apparatus elements; the claims merely conjoin old and known elements in an unpatentable aggregation. The claims are consequently invalid.

For the foregoing reasons Nestle's motion for summary judgment of invalidity of the four Reimus patents on the ground of obviousness will be granted

I. Invalidity for Withholding Information

Nestle's motion for summary judgment on the ground that Struthers failed to

inform the Patent Office that the subject matter of the Reimus patents was on sale and had been sold more than one year prior to the filing dates of the respective applications for the patent will be denied. As in the case of the Muller patents, the factual issues of knowledge and intent must be resolved and this cannot be done on a motion for summary judgment. DeLong Corp. v. Raymond Intern., Inc., 622 F.2d 1135 (3d Cir. 1980).

J. Conclusion

For the reasons set forth above, Nestle's motion for summary judgment of invalidity of the '129 and '353 patents because they claim subject matter given up during prosecution of the application for the '302 patent will be granted. Nestle's motion for summary judgment of invalidity of each of the four Reimus patents on the grounds of obviousness under § 103 and prior offer for sale, sale and use under § 102(b) will be granted.[32]

32. In view of these determinations, it is unnecessary to rule upon Nestle's contention that the '129, '353 and '723 patents are invalid by reason of double patenting.

V. The '126 and '722 Patents

Nestle moved for summary judgment of invalidity and/or unenforceability of Howell patent 3,367,126 (the '126 patent) and Ganiaris patent 3,636,722 (the '722 patent) on the following grounds:

1. The Howell '126 patent is invalid under 35 U.S.C. § 112.

2. The Howell '126 patent is invalid over the prior art.

3. The Howell '126 patent is invalid for prior public use and/or sale.

4. The Ganiaris '722 patent is invalid under 35 U.S.C. § 112.

5. Struthers is precluded from relitigating the subject matter claimed in the '722 patent.[33]

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33. At the hearing held on June 30, 1981 I denied Nestle's motion for summary judgment of invalidity of the '722 patent on the ground that the Board of Appeals'

(Footnote #33 cont.,)
decision in the Ganiaris A application was final and dispositive of the issue that the Ganiaris application is unpatentable over the prior art. I concluded that it would not be appropriate to apply collateral estoppel effect to the judgment of the Board of Appeals since it was unlikely that Struthers viewed that proceeding as having precedence effect.

6. The Ganiaris '722 patent is invalid over the prior art.

7. The Ganiaris '722 patent is invalid for prior public use and/or sale.

8. The Howell '126 and Ganiaris '722 patents are invalid and unenforceable by reason of Struthers' withholding of material facts from the Patent Office.[34]

After the hearing on the Group IV motion I reserved decision on grounds 1, 2, 3, 4, 6 and 7. This Part of this opinion concerns itself with those grounds.

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34. At the June 30, 1981 hearing I denied Nestle's motion for summary judgment of invalidity and/or unenforceability of the '126 and '722

(Footnote #34 cont.,)
patents on the ground that Struthers withheld material facts from the Patent Office for the reason that determining whether such a remedy is required by the equities of the case involves the resolution of disputed facts. DeLong Corp. v. Raymond Intern., Inc., 622 F.2d 1135 (3d Cir. 1980).

A. Description of the Patents

1. The Howell '126 Patent

The '126 patent is for a "Floating Agitator". The abstract of the disclosure reads: "A tubular crystallizer for solutions having an agitator shaft, an agitator means and a mounting means which are substantially the same weight per unit of length as the weight of the solution displaced by them."

As has been discussed at some length in previous Parts of this opinion, the process of freeze concentration of coffee or extracts of other substances may use a crystallizer. One form of crystallizer

is tubular in shape. The tubes through which the solution in which crystals are to be formed are inserted in a tank or larger tube containing the refrigerant. Inside the tube in which crystals are to be formed there are agitator blades having a slight clearance from the walls of the tube. These blades are oscillated or rotated and prevent the build-up of crystals on the walls of the tube.

The problem to which the '126 patent directs itself is that if the tube exceeds a certain length (depending on the kind and thickness of the material used in its construction) the agitator shaft sags in the middle, throwing off the alignment of the agitator blades, which then may scrape the walls of the tube.

In essence, the '126 patent solves this problem by introducing into the equipment (which is described at some

length in the specification) an "improvement in which said agitator shaft, said agitator means, and said mounting means are substantially the same weight per unit of length as the weight of solution displaced by said agitator shaft, said agitator means, and said mounting means per unit of length". Thus, the title "Floating Agitator". Since the equipment, in effect, floats in the fluid which surrounds it, it does not have the tendency to bend in the middle. This is what is claimed in claim 1 of the '126 patent. Claim 2 provides for an agitator shaft which is tubular and rounded in section. Claim 3 provides for gas under pressure within the hollow tubular agitator shaft.

The claims read as follows:

What is claimed is:

1. In a tubular crystallizer for solutions, having a tank, means introducing a refrigerant into said

tank, at least one elongated crystallizer tube passing through said tank, means introducing a solution into one end of said tube to pass through said tube, means withdrawing a solution and crystal slurry from the other end of said tube, wherein an agitator assembly comprises, in combination, an agitator shaft within said tube, bearing means at least at the ends of said shaft rotatably mounting said shaft within said tube, longitudinal agitator means, means mounting said agitator means a spaced distance away from said agitator shaft adjacent to said tube, and means driving said agitator shaft, said agitator shaft being hollow, the improvement in which said agitator shaft, said agitator means, and said mounting means are substantially the same weight per unit of length as the weight of solution displaced by said agitator shaft, said agitator means, and said mounting means per unit of length.

2. The combination according to claim 1 wherein said agitator shaft is tubular and rounded in section.

3. In a tubular crystallizer for solutions having a tank, means introducing a refrigerant into said tank, at least one elongated crystallizer tube passing through said tank, means introducing a solution into one end of said tube to pass through said tube, means withdrawing a solution and crystal slurry from the other end of said tube, wherein an agitator assembly

comprises, in combination, an agitator shaft within said tube, bearing means at least at the ends of said shaft rotatably mounting said shaft within said tube, longitudinal agitator means, means mounting said agitator means a spaced distance away from said agitator shaft adjacent to said tube, and means driving said agitator shaft, said agitator shaft being hollow, said agitator shaft, said agitator means, and said mounting means being substantially the same weight per unit of length as the weight of solution displaced by said agitator shaft, said agitator means, and said mounting means per unit of length, the improvement which includes gas under pressure within said hollow tubular agitator shaft.

2. The Ganiaris '722 Patent

The '722 patent bears the rather general title "Concentration of Coffee". There is no abstract of the disclosure. By way of background the specification notes that in the freeze concentration of coffee solutions containing 20% to 45% solids the solution must be cooled in the freeze concentration system to temperatures of 20° to 32°F. The

specification also notes that prolonged residence time of the coffee solution in the crystallizer is undesirable because coffee solids will be precipitated out of the solution in large quantities. To avoid this problem, according to the specification, a freeze concentration system (pipelines, tanks, crystallizers, etc.) should be designed so that the coffee extracts will have a residence time of less than 2.5 hours. Still, according to the specification, this should be accomplished by providing a ratio between 7:1 to 10:1 for the area of the heat transfer surfaces to the volume of the freeze concentration crystallizer.

The description of the preferred embodiment of the invention states that "a series of crystallizers may be used in sequence if desired" (emphasis added). Claim 1 provides for "plural serially connected crystallizer means". It

provides that the total annular volume of the crystallizer's inner shell to the area of said inner shell heat transfer surface shall be "sufficient" to avoid precipitate formation from the coffee. It further provides for a flow rate through the crystallization zone of greater than 40% per hour of volume. In any event, the two claims in the patent, in their entirety, read as follows:

What is claimed is:

1. An apparatus system for concentration of aqueous liquid coffee solution containing from 20 to 45 percent dissolved coffee solids, comprising:

a. plural serially connected crystallizer means, each having an outer shell, and an inner shell having a cylindrical heat transfer surface, forming ice therein at coffee temperatures down to 20°F.,

b. inlet and outlet means coupled to said crystallizer means to allow refrigerant to pass across the outside of the

heat transfer surface of the inner shell, and coffee solution to pass across the inside of the heat transfer surface of the inner shell through a crystallization zone having an annular cross section,

c. the ratio of the total annular volume of said crystallizer means inner shell to the area of said inner shell heat transfer surface being sufficient to avoid precipitate formation from coffee, said annular volume being provided by a hollow axial central cylindrical member within said inner shell,

d. means to provide a flow rate of said coffee solution through the annular crystallization zone of each said crystallizer means of greater than 40 percent per hour of the volume of each said crystallizer means, and

e. means separating ice from said coffee extract after passage through at least two serially connected crystallizer means.

2. An apparatus system according to claim 1 including coffee agitation means within said annular crystallization zone.

B. Prosecution of the Applications

Three applications for patent, all of which were owned and prosecuted by Struthers, are pertinent to this motion. The first application (Howell Serial No. 551,252; Exhibit 12) resulted in the Howell '126 patent. The second application (Ganiaris A; Serial No. 651,451; Exhibit 13) became abandoned when Struthers dismissed its appeal to the Court of Customs and Patent Appeals from the PTO Board of Appeals' affirmance of the final rejection of all claims of that application. The third application (Ganiaris B; Serial No. 879,843; Exhibit 14) resulted in the Ganiaris '722 pattent.

1. THE HOWELL APPLICATION (The '126 Patent)

On May 19, 1966 Struthers filed a patent application (Exhibit 12) in the

name of its employee, John D. Howell, for a "floating agitator". The application contained three claims to apparatus comprising an ordinary tubular crystallizer, having a hollow central shaft carrying agitator blades. The alleged novel feature was that the hollow shaft and its fittings have "substantially the same weight per unit of length as the weight of solution [it] displaced" thereby (claim 1; Ex. 12, p. 10) - in short, that the shaft assembly tend to float and be buoyant in the solution. Claim 2 called for the agitator shaft to be "tubular and rounded" (Ex. 12, p. 10). Claim 3 added the feature of pressurizing the hollow tubular shaft with gas (Ex. 12, p. 10).

The specification of the Howell '126 patent acknowledged that tubular crystallizers conventionally have central shafts carrying agitator blades, but

stated that crystallizers having a length over ten feet were costly and difficult to build, because the long central shaft tended to bend, with resultant misalignment (Ex. 12, p. 3). The asserted objects of the alleged invention included providing an agitator shaft assembly having substantially the same specific gravity as water, so that it might float within the crystallizer and reduce the load on the bearings (Ex. 12, p. 5). Pressurizing the interior of the shaft was said to stiffen it (Ex. 12, p. 8).

Claims 1 and 2 were rejected over the 1941 Crighton patent 2,267,081 (Tab I). Dependent claim 3 (for a gas pressurized shaft) was indicated to be allowable if presented in independent form (Ex. 12, p. 15). The Crighton patent provides a jacketed heat exchanger (chiller) having an axially mounted screw to move material

through the device. The screw preferably has a hollow center portion in order to reduce its weight (Tab I; p. 1, right col., lines 2-6). Howell similarly proposed a hollow shaft to reduce the weight of the shaft (Ex. 12, p. 3, lines 23-24, p. 5, lines 6-7).

In response to the official action, Mr. Drucker amended claim 1 to identify the portion which allegedly constituted the improvement over the prior art (by adding the words "the improvement in which") (Ex. 12, p. 17). He also replaced claim 3 by new, independent claim 4, which recited "the improvement which includes gas under pressure within said hollow tubular agitator shaft". (Ex. 12, p. 18.)

In arguing patentability of the claims over the Crighton reference, Mr. Drucker stressed that Howell assertedly provided a shaft which can be made of

"very long length without intermediate support", and that Howell's "purpose is the provision of a very long shaft which can be floated within the solution to be crystallized" (Ex. 12, pp. 18-19). The claims under consideration, however, are silent as to the feature of shaft length, upon which patentability was sought to be predicated. The response filed by Mr. Drucker did not "show how the amendments avoid such references" or "specifically [point] out how the language of the claims patentably distinguishes them from the references", as 37 C.F.R. § 1.111 requires.

The Howell application was allowed, and issued as a patent on February 6, 1968.

2. THE ABANDONED GANIARIS A APPLICATION (Serial No, 651,451)

In July, 1967 Struthers filed the

Ganiaris A application (Serial No. 651,451; Ex. 13). It claimed priority of a British application filed July 15, 1966 (Ex. 13, pp. 21-28).

The abstract of the application stated that in freeze concentration of coffee the ratio of the heat transfer area to the volume of the system should be between 1:7 to 1:10 (Ex. 13, p. 4). Like teaching appeared two pages later (Ex. 13, p. 6). On the next page of the application, however, the teaching is reversed; and it is said that the ratio of volume to area should be within that numerical range (Ex. 13, p. 7). In addition, the last of these three teachings states that the ratio is in units of feet, whereas the first two statements described the ratio without regard to any unit of measurement. It is impossible to tell, from the written description of the alleged in vention

contained in the Ganiaris A application, which ratio (area to volume or volume to area) should be within the stated numerical range.

The originally filed claims (Ex. 13, p. 9), however, specify that it is the ratio of area to volume which must be between 1:7 to 1:10. The prior British application (Ex. 13, pp. 21-28) -- which Ganiaris declared to be an "application for patent on this invention *** filed by me" (Ex. 13, p. 10) - teaches only a volume to area ratio within the stated range. The written description of the alleged invention contained in the British application is thus the reverse of what was claimed in Ganiaris A.

The Ganiaris A application also stated that "prolonged" residence time in the system would result in coffee solids precipitating out of solution in large quantities (Ex. 13, p. 4), and that

residence time of the extract in the system should be less than 2.5 hours (Ex. 13, p. 5). On the other hand, the application stated, growth of ice crystals depends on time spent within the crystallizers (Ex. 13, p. 5). On the other hand, the application stated, growth of ice crystals depends on time spent within the crystallizers (Ex. 13, p. 5). Therefore, it was said, because residence time within the crystallizer is the only known design parameter that affects both ice crystal growth and precipitate formation, "a relation of heat transfer area to volume for a crystallizer must be determined in order to insure a maximum crystal growth rate without precipitate formation" (Ex. 13, p. 6; emphasis supplied). Thus, the ratio of area to volume was described to be the essence of the alleged invention; but the description in the Ganiaris A

application, the claims in that application, and the prior British application contradict each other on this supposedly vital point.

In the first office action, dated April 25, 1968, the examiner failed to detect the contradictory and inadequate specification. He rejected all claims over the 1942 Harrington patent 2,306,602 (Tab J) which, like the Ganiaris application, describes a crystallizer having an outer shell for refrigerant, a central passage also for refrigerant, and a passageway between for the product to be cooled. The examiner pointed out that in the Ganiaris apparatus claims "the recitation of residence time, in claim 1, line 3, is a functional statement of intended use and the ratio limitation in lines 5-7 is an obvious design feature" (Ex. 13, p. 13). The examiner also cited other prior art patents showing

crystallizers of the Ganiaris type, including the '126 patent.

In response to the official action Mr. Drucker did not alter the specification, but he made various amendments to the claims. He argued that the originally claimed ratio of area to volume of 1:7 to 1:10 "is considered to be a critical aspect of the instant invention *** . This critical ratio range, which defines the invention in claims 1 and 2 is not shown or suggested in the cited references **** " (Ex, 13, p. 16). Mr. Drucker did not address the inconsistent character of the Ganiaris specification or deal with the portions which mandate that volume to area ratio be within the stated ranges or that the ratio is in units of feet.

In a further office action, dated July 9, 1968, the examiner stated that the arguments had been considered but

were not persuasive. He again rejected the claims over the Harrington patent and pointed out that the claims did not distinguish structurally over the reference, stating:

> Applicant's heat exchanger is conventional and the invention, if any, resides in a method of operating the heat exchanger and not in the heat exchanger itself.
>
> (Ex. 13, p. 19.)

This rejection was made FINAL.

An appeal was noticed to the Patent Office Board of Appeals (Ex. 13, p. 33). Thereafter, an amendment was filed purporting to change the "critical" area to volume ratio taught in the first part of the specification and specified in the claims and to convert it to a volume to area ratio.

No explanation was provided for changing the application in such manner that it no longer supported the subject

matter which had been claimed, argued and appealed. It was merely stated that the specification was amended to be consistent with the equation at page 4 of the application (Ex. 13, p. 7). The inconsistency of that formula with the earlier parts of the specification, and with the subject matter theretofore pursued in prosecution, was not mentioned. The specification, as amended, was utterly confusing, referring to "the volume of the heat transfer surfaces" and to "the area of the freeze concentration system". The amendments did not conform to the application as filed; see 35 U.S.C. § 132 and 37 C.F.R. § 1.118.

Claim 1 was also amended to reverse the ratio to a volume to area ratio and to add recitation of "means to provide a flow rate of said coffee solution through said crystallizer of greater than 40% per

hour of the volume of said crystallizer". It was urged that this newly added feature, together with the newly stated ratio, distinguished over the art.

The examiner entered the amendment for purposes of appeal, but persisted in his rejection of the claims (Ex. 13, p. 34). Struthers' brief on appeal argued that the now-reversed volume to area ratio of 1:7 to 1:10 was "critical" and not shown in the prior art (Ex. 13, p. 38). The examiner's answer to Struthers' brief pointed out that the volume to area ratio (which corresponds to an area to volume ratio of 7:1 to 10:1) "is only another way of stating that there should be a large area of cooling surface relative to the volume of material being treated" and "the higher the area of heat transfer the higher will be the rate of heat transfer. Claim 1 is so broad that

it would read on a small diameter tube through which a product passes while being chilled by the refrigerant surrounding it" (Ex. 13, p. 43). The examiner added that Ganiaris was claiming apparatus, not method, and that "the method of using a device is immaterial to the question of patentability of claims directed to structure of the device" (Ex. 13, p. 44).

Struthers' reply brief again insisted that the volume to area ratio "is critical and it was so stated in the application as filed" (Ex. 13, p. 48).

After oral hearing, the Patent Office Board of Appeals affirmed the final rejection of all claims. Ex parte Ganiaris, Appeal No. 892-51, April 1, 1969 (Ex. 13, p. 51). The three Examiners-in-Chief comprising the Board of Appeals held that the claims did not distinguish over the prior art. The

claimed recitation of means to provide a flow rate of greater than 40% per hour of the volume of the crystallizer was held to be unavailing, because "appellant has disclosed no structure of a means for providing such specific rate" (Ex. 13, p. 52). The recitation of "concentration of an aqueous coffee solution containing from 20 to 45% coffee solids" was held to be a patentably ineffective use limitation, the claims being directed to apparatus (Ex. 13, p. 52).

As to the alleged criticality of the ratio of volume to surface area, the Board held:

> For the limits of a range to be critical, the results or characteristics achieved within the range must be different in kind rather than in degree from those achieved outside the range. [Citations omitted.] Criticality must be disclosed in the application. [Citations omitted.] Moreover, the basis of the allegation of criticality must be shown either

> in the application itself or in the record. [Citations omitted.] There is no disclosure in appellant's specification that the claimed range is critical. Moreover appellant has presented no evidence that the said range is critical. There is before us no evidence that results different in kind rather than degree are necessarily obtained in appellant's process when the involved ratio is 1:5 or 1:12. Appellant has disclosed no specific example of dimensions of the apparatus of his Figures 1 and 2 which will have a ratio lying within the range of his claims. Accordingly either his disclosure is insufficient or it would be obvious to one skilled in the art how to calculate suitable dimensions. * * * Moreover, we take official or judicial notice that it is well known in the heat exchange art that the greater the heat exchange surface area per unit volume [of] liquid to be cooled the faster is the rate of the cooling process. Conventional radiators of a hot water heating system for a house or conventional radiators of an automobile illustrate that this principle has long been known.
>
> (Ex. 13, pp. 53-54; emphasis in original.)

Following the Board of Appeals' affirmance of the final rejection of the claims on appeal, Struthers noticed a further appeal to the Court of Customs

and Patent Appeals (Ex. 13, p. 56). In contrast to Struthers' briefs before the Board, the stated reasons of appeal asserted that criticality was not an issue before the Board, and that the Board erred in stating that there is no disclosure in the application that the claimed ratio range is critical (Ex. 13, p. 57).

The appeal was never heard by the CCPA. Struthers filed another patent application (Ganiaris B) and the appeal to the CCPA was thereafter dismissed on Struthers' own motion (Ex. 13, p. 63), after claims of the Ganiaris B application had been rejected for double patenting over the claims of Ganiaris A.

3. THE GANIARIS B. APPLICATION (The '722 Patent)

On November 25, 1969, during pendency of the appeal of Ganiaris A to the Court

of Customs and Patent Appeals, Struthers filed a further application (Serial No. 879,843; Ganiaris B; Ex. 14). It purported to be a "division" of Ganiaris A application, even though no requirement for division or restriction had been made by the examiner in Ganiaris A (see 35 U.S.C. § 121).

The specification of the Ganiaris B application was similar to that of the Ganiaris A application, except that ratio of area to volume was restated to between 7:1 and 10:1, no units being given (Ex. 14, pp. 3, 5). At the end of the specification of Ganiaris B, the ratio of volume to area is stated to be 1:7 to 1:10, expressed in feet (Ex. 14, p. 7).

Original claim 1 of Ganiaris B was essentially identical to amended claim 1 of Ganiaris A on appeal to the CCPA (it claimed an "apparatus system" rather than "apparatus" and "crystallizer means"

rather than a "crystallizer"). Claim 2 of Ganiaris B merely called for plural crystallizers (Ex. 14, p. 8).

In the first official action (Ex. 14, p. 14) the examiner rejected claims 1 and 2 of Ganiaris B for double patenting over the appealed claims of Ganiaris A, observing that they were "substantial duplicates", Claims 1 and 2 were also rejected as unpatentable over the 1932 Vogt patent 1,847,149 (Tab F), which shows tubular crystallizers providing volume to area ratios of 1:16 and 1:3, which embrace the 1:7 to 1:10 ratio claimed by Ganiaris. The examiner observed that it would be "an obvious expedient to vary this ratio so as to be within" Ganiaris claimed range (Ex. 14, p. 15). Claims 1 and 2 were also rejected over the 1942 Harrington patent (Tab J), upon which the Board of Appeals had affirmed the rejection of the

Ganiaris A claims. Three other patents were cited to show crystallizers of the Ganiaris type: Struthers' Reimus patent '302, filed December, 1965 (Tab Q); the 1959 Kolner patent 2,886,587 (Tab K); and the 1965 Jackson patent 3,212,283 (Tab L).

In reply to the office action Mr. Drucker did not amend, but added two new claims and proposed a new Figure 3 for the drawing (Ex. 14, p. 18-21). New claim 3 for the first time omitted the volume to area ratio which Mr. Drucker had previously insisted to be critical during prosecution of Ganiaris A, and which was recited in claim 1 of Ganiaris B. In its place new claim 3 substituted the statement:

> (c) the ratio of the total annular volume of said crystallizer means inner shell to the area of said inner shell heat transfer surface being sufficient to avoid precipitate formation from coffee

(Ex. 14, p. 18.)

Mr. Drucker's accompanying remarks did not comment upon this new clause, or point out how its language patentably distinguished or avoided the references. Compare 37 C.F.R. § 1.111.

Mr. Drucker traversed the rejections on the Vogt and Harrington patents by arguing that neither reference shows the "critical provision of means to provide a flow rate greater than 40% per hour of crystallizer volume" (Ex. 14, p. 20). The Board of Appeals, of course, had held in Ganiaris A that "appellant has disclosed no structure of a means for providing such specific rate" (Ex. 13, p. 52; original emphasis), and there was no description of such means in Ganiaris B. The volume to area ratio, formerly asserted to be "critical" in prosecution of Ganiaris A, was not mentioned.

The Ganiaris B specification did not

describe a flow rate greater than 40% per hour of the volume of the crystallizer, as called for in the claims. Rather, the specification stated: "To avoid the problem of precipitation, a freeze concentration system for coffee extracts should be designed to have a residence time of less than 2.5 hours [which is equivalent to a flow rate of greater than 40% per hour]. Therefore, the entire volume of the freeze concentration system (pipe lines, tanks, crystallizers, etc.) should be less than 2.5 times the hourly flow rate through the system" (Ex. 14, p. 4). The application thus expressly distinguished between the volume of the crystallizer and the volume of the entire system. Since a residence time of less than 2.5 hours can be expressed as a flow rate of greater than 40% of the volume per hour, the specification spoke of one volume (the entire system) while the

claims spoke of a quite different volume (the crystallizer only). The examiner observed in the next official action, "Surely the applicant cannot contend that having a residence time of less than 2.5 hours is new" (Ex. 14, p. 25).

The next office action (Ex. 14, p. 23) again rejected all claims. Claims 1 to 4 were rejected for double patenting over the appealed claims of Ganiaris A, and noted that a terminal disclaimer had not been filed. Claims 1-4 were then rejected over Reimus '302 patent, filed 1965 (Tab Q), which was cited to show that precipitation from coffee is time-dependent, in view of Bevarly patent 3,389,567, filed 1961 (Tab R), which was cited to show cooling equipment having a high ratio of area to volume and a low residence time. The examiner stated:

The specific recitation of providing

> a flow rate such that residence time is less than 2.5 hours, is of no significance since this upper limit is so high that practically every system which the Examiner has seen in his search meets this limitation. Surely the applicant cannot contend that having a residence time of less than 2.5 hours is new. Also the volume to area ratio of 1:7 to 1:10 is of no patentable significance since there is nothing in applicant's specification or remarks which would indicate that this range is critical. The art teaches applicant's basic concept of having a high ratio of area to volume and therefore the fact that applicant recites a specific high ratio without any showing of improved results by reciting such a ratio is not persuasive.
>
> (Ex. 14, p. 25.)

Claims 1 and 2, which recited the numerical volume to area ratio were rejected under 35 U.S.C. § 112 for failure to state the dimension (which was expressed in feet in the specification; Ex. 14, p. 7). As the examiner pointed out, the volume to area ratio is not dimensionless and, therefore, varies with the units used for measurement (e.g.,

volume in cubic feet divided by area in square feet gives a ratio expressed in feet -- a different ratio would be obtained if the ratio were calculated in inches, yards or meters).

Claims 1 and 2 were additionally rejected as unpatentable over the 1932 Vogt patent 1,847,149 (Tab F.). The examiner stated, "obviously those skilled in the art would provide a pump for patentee's apparatus such that the residence time is less than 2.5 hours. To not do so would be rather absurd since the optimum usage of the apparatus would dictate maximum flow rate" (Ex. 14, p. 26)

Cottle, et al. patent 3,362,178, filed January, 1964 (Tab P), was cited as teaching the precipitation problem, but was not applied to reject the claims.

Mr. Drucker thereafter filed an amendment (Ex. 14, p. 29) cancelling

claims 1 and 2 and amending claim 3. He stated that the double patenting rejection was moot because the Ganiaris A application had been abandoned (Struthers with drew the appeal to the CCPA; Ex. 14, p. 29). It was argued that various features of the claims were not shown in the Reimus and Bevarly patents, e.g., that the Reimus '302 patent did not show serial ice crystallizers, and did not show a hollow axial core member (Ex. 14, p. 31). Mr. Drucker did not, however, bring to the examiner's attention that Struthers' Howell '126 patent (filed May, 1966) discloses a hollow axial core member. The examiner was told that:

> Several critical features not found together in the prior art are set out as claim elements. These features define a commercial process as distinct from a theoretical laboratory curiosity.
>
> (Ex. 14, p. 32.)

The Ganiaris B application was thereupon allowed, and issued as the '722 patent.

C. Prior Sale - Nestle's and Struthers' Contentions

One ground for Nestle's motion for summary judgment of invalidity of the '126 and '722 patents is that the equipment which Struthers contracted to sell and sold to General Foods in 1964 (more than one year prior to the filing dates of the two patents and of the British application) incorporated the inventions of the '126 and '722 patents. It is illuminating to examine the thrust and parry of Nestle's and Struthers' contentions in this regard.

1. Nestle's Initial Submission: Nestle laid the factual foundation for its motion by referring to the previously

described offer and sale to General Foods of Struthers' "FreCon" freeze concentration process and by submitting Struthers' responses to discovery relating to the '126 and '722 patents.

Nestle contended that Struthers' answer to General Foods' Interrogatory 119 (of record as Nestle's Deposition Exhibit 39, Tab G) establishes that equipment claimed in the Howell '126 patent was delivered to General Foods in November and December of 1964 and incorporated into the first Hoboken plant. Part 43 of that interrogatory answer (at p. 28) states:

> 43. Struthers achieves a reasonably long shaft length in its crystallizer without the use of spiders, by utilizing a hollow shaft. The diameter of the shaft is carefully selected so that when the crystallizer is filled with slurry, the weight of the shaft just equals the weight of the displaced slurry, thereby eliminating unsupported weight which would cause bowing.

> Additionally, the hollow shaft serves the important process function of reducing crystallizer retention time. (Emphasis supplied.)

That equipment was sold to General Foods by contract dated August 12, 1964. In addition, Struthers' supplemental answer to Nestle's Interrogatory 50 states that General Foods has infringed the Howell '126 patent by use of equipment sold to it by Struthers in 1964 and 1965.

Nestle further contended that the alleged invention of the '722 patent was incorporated in equipment sold by Struthers to General Foods by contract of August 12, 1964 and delivered in November and December, 1964 (as well as in equipment sold by the second General Foods contract of September, 1965 and delivered to General Foods in December, 1965). Struthers' sworn answers to General Foods' Interrogatory No. 119,

supra, states (at p. 26):

> Residence time in the crystallizer should be on the order of 15 to 30 minutes. Longer retention time would permit growth of crystals to a larger size, however, long retention is disadvantageous from the point of view of flavor. . . . The ratio of heat exchange surface to crystallizer volume used in the plant built for Maxwell House is believed to be at or near the optimum.

2. Struthers' Initial Response:

Struthers' answer to Nestle's factual submissions relating to the '126 patent is contained in paragraph 12 of Ganiaris' affidavit:

> 12. The Howell '126.concept of a floating shaft was incorporated in the equipment sold to General Foods Corporation under the 1965 contract. The shafts for the first stage crystallizer under the 1964 contract did not incorporate (and could not have incorporated) the Howell '126 concept. Mr. Howell was not associated with Struthers in 1964. He joined the company sometime in March or April 1965.

Struthers' answer to Nestle's factual submissions relating to the '722 patent is likewise contained in an affidavit of Mr. Ganiaris:

> 47. The sales contract dated August 12, 1964 included a complete freeze concentration system with two crystallizers. Only one of the crystallizers had a hollow shaft. In 1964, the one crystallizer with a hollow shaft was used as a first stage crystallizer and the coffee extract was concentrated from about 24% to 36-37% coffee solids. Furthermore, the crystallizer had several tubes connected in parallel.
>
> 48. The Ganiaris '722 concept was developed later and involved concentrating coffee extract from 20-45% and the tubes were 'serially connected' in serpentine form, as distinguished from the earlier system where the tubes were parallel and only connected at the beginning and the end.
>
> 49. The equipment supplied to General Foods under the September 30, 1965 sales contract did not come within the claims of the '722 patent because, for example, the equipment did not incorporate the flow rate of 'greater than 40% per hour of the volume of each crystallizer' specified in claim 1(d) of my '722 patent.

3. Nestle's Reply: In response to the statements of Mr. Ganiaris concerning the '126 patent, Nestle noted again that Struthers had admitted under oath that a crystallizer incorporating a long, hollow shaft having a weight which "just equals the weight of the displaced slurry" was sold by Struthers to General Foods in the August, 1964 contract and was delivered to General Foods and incorporated into the first Hoboken plant by the end of 1964. Mr. Ganiaris did not deny these facts and in his affidavit conceded the sale of the crystallizer. The only effect of Mr. Howell's non-employment by Struthers in 1964, Nestle urges, is to show that Howell did not invent the subject matter patented and to show that the oath or declaration which accompanied the application was false.

Answering Ganiaris' statements directed to the '722 patent, Nestle contended:

a. General Foods' use of the crystallizer to concentrate extract from 24% to 36-37% solids is immaterial since the claim defines apparatus, not a process. Thus, no matter what the use to which it was put, sale and offer of sale of the crystallizer had the invalidating effect.

b. As to Ganiaris' statement that the '722 concept was developed later: (i) insofar as the concept resided in "providing annular crystallizer volume", any crystallizer having a central shaft has an annular volume; (ii) insofar as the concept involved a "serpentine" form of connection, no such concept is disclosed or claimed in the '722 patent; and (iii) Ganiaris' affidavit is in direct conflict with Struthers' sworn

answer to Nestle Interrogatory 62 (p. 42), which avers: "The invention of each of the ['722] claims was first conceived in April 1964", a date well prior to the August, 1964 contract of sale and delivery later that year.

c. The flow rate specified in the '722 claim is not structure and it is immaterial whether the apparatus sold to General Foods was used in a manner which provided such a flow rate.

4. Struthers' Surrebuttal:

Struthers filed another affidavit of Mr. Ganiaris on the very day when the Group IV motion was argued.

In that affidavit, Mr. Ganiaris, in effect, disavowed Struthers' answer to General Foods' Interrogatory 119, which stated, in part, with respect to equipment sold to General Foods in 1964: "The diameter of the shaft is carefully

selected so that when the crystallizer is filled with slurry, the weight of the shaft just equals the weight of the displaced slurry, thereby eliminating unsupported weight which would cause bowing." That statement, given under oath by Struthers, is completely clear and unequivocal and constitutes a bald admission that in 1964 Struthers sold equipment incorporating the invention claimed in the '126 patent. Ganiaris' last-minute response - "That shaft did not, and was not intended to, 'float'. Struthers' answer to General Foods' interrogatory 119 is not completely clear on this matter, and if it is inconsistent with the foregoing, the answer is wrong."

All too often in the prosecution of its patents and in the prosecution of this law suit Struthers, when backed into a corner, simply changes its story without explanation or apology. I shall

discuss this further when dealing with the question whether there is a genuine issue of material fact with respect to Nestle's prior sale contention.

Finally, Ganiaris' twelfth hour affidavit seeks to explain Struthers' answer to Nestle Interrogatory 62, which asserted that the "invention of each of the ['722] claims was first conceived in April 1964". In his original affidavit in opposition to the Group IV motion Mr. Ganiaris had stated that the concept for the '722 patent "was developed" after the August, 1964 sales contract with General Foods. Ganiaris' explanation -- "However, conception is not the same thing as development of an invention. Indeed, the same interrogatory cited by Nestle states that the first reduction to practice of the invention was in 'early 1965'."

This, then, is a summary of the

factual data upon which summary judgment on the ground of prior sale must be granted or denied.

D. Invalidity of the '126 Patent under §112

Nestle contends that the claims of the '126 patent are invalid under 35 U.S.C. § 112 because they fail particularly to point out and distinctly claim the subject matter which the applicant regarded as his invention, because they are incomplete and indefinite and do not define an operative apparatus, and because they are vague and indefinite. Nestle points to the following alleged deficiencies to illustrate its § 112 contentions:

a. While the '126 specification relates to tubular crystallizers having a shaft length in excess of 10 feet, the claims are silent as to shaft length and could read on very short shafts.

b. The claims do not define any

means for exhausting or removing spent refrigerant from the tank; thus the apparatus is inoperative.

c. The claims use the term "substantially" in defining the improvement constituting the invention -- the agitator having "substantially" the same weight as the displaced solution. The term is undefined, according to Nestle, and cannot serve to claim with particularity and distinctly the novel feature of the apparatus.

d. Similarly, Nestle asserts that Claim 3 is vague and indefinite in defining "gas under pressure" within the shaft as the alleged improvement, there being not the slightest suggestion as to how much pressure is to be used.

It does not appear that Nestle is challenging the '126 patent on "description" or "enablement" grounds under the first paragraph of § 112,

namely, that the specification fails to "contain a written description of the invention, and of the manner and process of making and using it . . . so as to enable any person skilled in the art to which it pertains . . . to make and use the same". Rather, Nestle argues that the claims do not meet the "definiteness" requirements of the second paragraph of § 112 in that they do not particularly point out and distinctly claim the subject matter which Struthers regards as its invention.

The purpose of the definiteness requirement "is to demarcate the boundaries of the purported invention, in order to provide notice to others of the limits 'beyond which experimentation and invention are undertaken at the risk of infringement'." Rengo Co. Ltd. v. Molins Machine Company, Inc., supra, slip op. at 33.

The invention claimed in the '126 patent is absurdly simple. It consists of a crystallizer in which, to prevent an agitator shaft from sagging by reason of its own length and weight, (i) the agitator shaft, the agitator means and the mounting means are substantially the same weight per unit of length as the weight of the solution they displace (claims 1 and 2) and/or (ii) the stiffening effect is imparted by gas under pressure within the hollow tubular agitator shaft (claim 3). The claims sufficiently impart notice to others. If the '126 patent claims more than this I believe that there would be serious § 112 problems. However, I believe this is the sum total of the "invention". If an inventor seeks to stiffen an agitator shaft by partially submerging it in a liquid or by pumping gas under pressure into the shaft's innards he is, assuming

the validity of the '126 patent, treading on dangerous ground.

Consequently, Nestle's motion for summary judgment of invalidity of the '126 patent based on § 112 grounds will be denied.

E. Invalidity of the '126 Patent over the Prior Art Obviousness

The Court observed in Graham v. John Deere, supra, "a patentable invention [must] evidence more ingenuity and skill than that possessed by an ordinary mechanic acquainted with the business". 383 U.S. at 11. On the basis of the indisputable facts in the record the '126 patent connot meet this requirement.

The independent claims of the Howell patent are in a form known as Jepson-type format (from a 1917 Commissioner's decision in Ex parte Jepson, 1917 C.D. 62). The Jepson form of claim sets forth

in the preamble that which is old and known, and then sets forth as the "improvement"that which the patentee regards as new. Use of that form of claim is sanctioned and encouraged by the PTO Rules of Practice, which provide, in 37 C.F.R. § 1.75(e):

> Where the nature of the case admits, as in the case of an improvement, any independent claim should contain in the following order, (1) a preamble comprising a general description of all the elements or steps of the claimed combination which are conventional or known, (2) a phrase such as 'wherein the improvement comprises' and (3) those elements, steps and/or relationships which constitute that portion of the claimed combination which the applicant considers as the new or improved portion.

Jepson-type claims have also received judicial recognition. See e.g., Application of Aldrich, 398 F.2d 855, 857 (CCPA 1968):

> We make the following points about claim 1, which apply, of course, to all claims due to their dependency on

> claim 1. The claim is in Jepson form and implicitly makes it known that it is old to make paper with the named water-insoluble paper additives by adding them to the aqueous suspension of paper-making fibers.

See, also, Sanford v. Kepner, 195 F.2d 387, 389 (3d Cir.), affirmed, 344 U.S. 13 (1952):

> Such reference in a patent claim to the structural setting within which a particular invention has been designed to operate is proper and familiar, but does not enlarge the invention.

The Jepson form of Howell's claim 1 admits that the combination of elements set forth in the preamble (preceding the improvement clause) was old and known, including the provision of a tubular crystallizer. And, indeed, the prior art set forth below shows that to be the case. The sole asserted improvement is nothing more than applying the well-known principle that the weight of an object is "substantially" the same as the weight of the solution it displaces. That is the

feature Mr. Drucker asserted as "the very point of novelty" (Ex. 12, p. 18) when using very long shafts.

The genesis of the '126 patent illustrates its lack of novelty or originality and how one with no skill in the art was able to handle the concepts involved. Howell, the alleged inventor, had no experience in freeze drying or spray drying of liquids. He had no experience in the removal of insolubles from liquids. He worked as a senior machine engineer for Struthers for sixteen months and prior to that time he had no background in coffee processing technology (Struthers' answers to Interrogatories 26 and 43 in the action instituted by Struthers against Coca-Cola). He testified in the General Foods litigation as follows:

Q. Let me ask you to state in your

own words the nature of the invention which that patent [Howell '126] relates.

A. The nature of the invention was, as I think I explained before, that they asked me whether it wouldn't be wise to increase the wall thickness to stiffen it up against deflection.

Q. That is the crystallizer, is that right?

A. Yes. And I thought about it a minute, and -- well, maybe more than a minute. By the next day I came in, 'Look, if we make it so it floats, it doesn't have too much buoyancy but just has a reasonable buoyancy, we don't have to work with deflection. The thing is running in the liquid.' I put this down in my lab notebooks and calculated just what size pipe, standard pipe, would come nearest to this and figured it out, and actually I think we reduced the thickness of the pipe rather than increasing it, as I remember it.

Q. By 'the thickness of the pipe' you are talking about the --

A. About the shaft itself, the hollow shaft itself.

Q. So what, essentially, was the nature of the invention?

A. I would say essentially the nature of the invention was so designing this hollow shaft that it was substantially supported by the liquid around it. In other words,

there could be variations, of course. You are not going to get an absolute neutral buoyancy.

Q. How did you go about achieving that condition?
A. By selecting a pipe whose volume would be equivalent in water to the weight of the water displaced by the pipe itself and the blades on it.

Q. Would you agree with me, then, that this equivalency of weights to which you have referred is essentially the hallmark of your invention to which your patent relates?

A. Yes.

(Howell Tr. 98-99; Item 1; emphasis supplied.)

As Nestle enjoys noting and repeating, the '126 patent constitutes the application of Archimedes' principle which has been available for all to use for some twenty centuries.

Archimedes Principle, It is a fact of common experience that a body, when wholly or partially immersed in a fluid, is buoyed up by the fluid. Like Pascal's principle, the explanation of this effect follows directly from the laws of mechanics and does not depend on any special properties of a fluid. ***

A body immersed in a fluid is buoyed up with a force equal to the weight of the displaced fluid.

This is Archimedes' principle.

1 Sears, Principle of Physics, 305-306 (1946); (Tab V).

In its brief directed to the Group IV motion, Struthers admitted that "Howell's invention of an ice tubular crystallizer [is] based on Archimedes principle which utilizes hollow axial shafts . . . ", at p. 11.

The prior art is replete with instances in which Archimedes principle is used to avoid bending and in which hollow shafts are used to lighten the load or for other reasons.

The 1889 de Ferranti patent 408,295 (Tab B) discloses a floating heavy armature in an electric meter: "The armature, when itself imersed may be hollow to increase its floatation." The

1882 Hayes patent 267,425 (Tab A) discloses a wheel axle rigidly secured to a float, which is buoyed by a bath of quicksilver. The 1905 Low patent 803,770 (Tab C) discloses a measuring instrument comprising a long shaft floating in a bath of liquid of appropriate specific gravity, in order to avoid deformation (bending) of the long shaft. The 1918 von Post patent 1,256,747 (Tab D) discloses a weighing device in which the rotating parts are buoyed by mercury liquid or other suitable fluid.

The Meyer patent 3,176,403 (Tab R-9) teaches avoidance of sagging or bending of a long measuring element, without using intermediate supports, by floating it in a liquid. "By determining the material and dimension of the measuring element *** relative to the specific weight of the liquid 23, it is possible to insure that the compensating and

sustaining effects of the liquid corresponds with the weight of the measuring element and thus any sagging is eliminated" (Col. 2, lines 29-35).

The 1930 Vogt patent 1,783,864 (Tab E) discloses tubular crystallizer for chilling or freezing the treated material to the desired degree of plasticity. Blades or scrapers mounted on an axial shaft wipe the chilled material from the interior walls of the crystallizer. The 1932 Vogt, et al. patent 1,847,149 (Tab F) discloses such an apparatus for congealing ice cream or for crystallizing chemicals from solution. The 1935 Miller patent 2,023,607 patent (Tab G) shows such apparatus having a hollow axial shaft, more than thirty years before Howell. The 1941 Crighton patent 2,267,081 (Tab I) (cited by the Patent Office) provides a jacketed heat exchanger (chiller) having an axially

mounted screw to move material through the device. The screw preferably has a hollow center portion in order to reduce its weight.

Accordingly, claim 1 of the '126 patent represents no advance in the crystallizer art. The patent merely employs the hollow axial shaft taught by the prior art, and the principle taught by Archimedes and widely used by the art for centuries. It would be obvious to one skilled in the art (or even to one unskilled in the art, such as Howell) to apply this principle to a crystallizer. There can be no factual issue in this regard.

Claim 2 adds only the redundancy that the hollow shaft is "tubular and rounded". Shafts of that character are shown in Miller (Tab G) and several other prior art references.

Claim 3 defines the allegedly novel

improvement as gas under pressure within the hollow shaft. This well-known expedient stiffens footballs, balloons and bladders of various sorts and prevents them from collapse. The claim defines nothing novel, unobvious or patentable.

Without deciding whether the '126 patent is invalid under 35 U.S.C. § 102(a) and (b), it is clearly invalid on the basis of the undisputed facts in the record by reason of obviousness. 35 U.S.C. § 103. Summary judgment of invalidity will be entered on that ground.

F. Invalidity of the '126 Patent by Reason of Prior Sale

There is no doubt in my mind that the factual material which Nestle submitted in support of its motion for summary judgment of invalidity on the ground of

prior sale of the '126 patent was sufficient to grant the motion. In particular, Struthers' answer to General Foods' Interrogatory 119 established the factual basis for such a ruling. The answer stated that Struthers had sold to General Foods in 1964 an ice crystallizer which utilized a hollow shaft designed so that "the weight of the shaft just equals the weight of the displaced slurry, thereby eliminating the unsupported weight which would cause bowing".-- the very essence of the '126 patent.

As described above, on the day of argument Struthers submitted an additional affidavit signed by Mr. Ganiaris which, when stripped of its circumlocutions, stated that the answer to Interrogatory 119 was false. This new affidavit did not even attempt to explain why or how a false affidavit was filed. At oral argument Struthers' attorneys

simply argued that the new affidavit created a disputed issue of a material fact and that it would be a proper subject of cross-examination at the trial.

Reluctantly I conclude that for the time being, at least, the affidavit does create an issue of material fact and precludes granting summary judgment on this ground. Nevertheless, Struthers' casual treatment of the filing of a false statement under oath with a court (even though it was not this Court) is unacceptable. If this case is not concluded by disposition of the motions for summary judgment and any appeals therefrom, the matter will have to be pursued further.

G. Invalidity of '722 Patent under § 112

Struthers' confused and inept prosecution of the Ganiaris A and

Ganiaris B applications has been deseribed in Parts V B(2) and V B(3) of this opinion. The end result is the '722 patent which clearly fails to comply with the provisions of 35 U.S.C. § 112 in a number of respects. The following are examples of these deficiencies.

In its supplemental answer to Nestle Interrogatory 62, Struthers stated, with respect to the '722 patent (at page 42):

> The patentee's contribution to the state of the art and the advance made over the prior art resides in a provision of a system for the freeze concentration of coffee, the ratio of the area of the heat transfer surfaces of the heat [sic] crystallizer to the volume of the cryatallizer being between 7:1 to 10:1

The claims of the '722 patent do not, however, particularly point out and distinctly claim that alleged invention. The claims make no mention of the ratio of area to volume, even though that ratio

was represented by Struthers to be critical in prosecution of the Ganiaris A application before the examiner and before the Board of Appeals (supra, pp. 211-213). The claims are consequently invalid under the definiteness requirement of the second paragraph of § 112 for failure to define that which Struthers contends and admits, in this litigation, to be the "invention" of the '722 patent.

The wholly functional statement which Struthers substituted for the ratio of area to volume (in clause c of patent claim 1) does not satisfy § 112. It is plainly inadequate to define the alleged invention, as witness Struthers' supplemental answer to Interrogatory 62, supra. Moreover, the specification of the '722 patent does not contain a written description of the claimed invention and, in particular, it does not

teach that any ratio can be "sufficient to avoid precipitate formation from coffee". To the contrary, the specification warns that to avoid precipitation the residence time of the coffee extract in the system must be less than 2.5 hours. The claims are thus inaccurate, indefinite and misdescriptive and consequently invalid under § 112. General Electric Co. v. Wabash Appliance Corp., 304 U.S. 364 (1938); United Carbon Co. v. Binney & Smith Co., 317 U.S. 228 (1942)

A further deficiency of the claims relates to the prescribed flow rate. Clause d of claim 1 calls for a flow rate through the crystallizer greater than 40% per hour of the crystallizer volume. The specification requires, and the Ganiaris A application claimed, a residence time of less than 2.5 hours. The examiner rejected that feature as an attempted

distinction over the art, saying: "Surely the applicant cannot contend that having a residence time of less than 2.5 hours is new" (Ex. 14, p. 25). Struthers did not challenge that observation, but substituted flow rate for residence time (apparently on the theory that a flow rate of greater than 40% of the volume per hour results in a residence time of less than 2.5 hours).

In amending the claims to the form in which they appear in the patent, however, a defect was introduced. The specification clearly states that the entire volume of the system, including "pipelines, tanks, crystallizers, etc.", should be less than 2.5 times the hourly flow rate through the system (col. 1, lines 32-35). That is not what the claims specify, however. The claims, instead, base the flow rate to the volume of the crystallizer only. Consequently,

the claims are invalid under the definiteness requirement of the second paragraph of § 112 because they do not particularly point out and distinctly claim the subject matter which the applicant regarded as his invention and described in the specification. Alternatively, the patent is invalid under the description requirement of the first paragraph of § 112 because the specification does not contain a full, clear and exact written description of the invention claimed. Application of Smith, 458 F.2d 1389, 1394 (CCPA 1972).

Clause e of claim 1 is likewise without foundation in the specification, and it is also ambiguous and indefinite. Struthers argued that the claim calls for separating ice only after the extract passes through a series of crystallizers, and urged that this feature distinguished over the Reimus reference "who removes

the ice at each stage" (Ex. 14, p. 31). There is nothing in the claim, however, which precludes ice removal after each crystallizer, as in Reimus; the claim, accordingly, does not particularly point out and distinctly claim the invention which Struthers represented it to define. Moreover, the specification merely states that "a series of crystallizers may be used in sequence if desired" (col. 2, lines 18-19); it does not contain a full, clear and exact description of the invention Struthers has purported to patent. The result is invalidity under the first and second paragraphs of § 112.

The claims are defective and fail particularly to point out and distinctly claim the alleged invention in that, while directed to an "apparatus system",

they employ process or use recitations to define the alleged invention. The Board of Appeals held that the Ganiaris A apparatus is unpatentable over the prior art, and recitations of intended use cannot render the old apparatus patentable (Ex. 13, p. 52). The claims of the '722 patent are likewise directed to apparatus, and their reliance on use limitations does not particularly point out and distinctly claim the apparatus. Cf., Application of Sinex, 309 F.2d 488, 492 (CCPA 1962) ("the expression 'for reconcentrating liquid dehydrating agents' is merely a statement of intended use and does not qualify or distinguish the structural apparatus claimed over the reference").

Nestle's motion for summary judgment of invalidity of the '722 patent on the grounds that it fails to comply with the requirements of 35 U.S.C. § 112 will be granted.

H. Invalidity of the '722 Patent over the Prior Art -- Obviousness

Nestle urges that the '722 patent is not entitled to the benefit of a filing date earlier than the November 25, 1969 filing date of the Ganiaris B application. It must be determined, therefore, whether the '722 patent is entitled to the benefit of the July 26, 1967 filing date of Ganiaris A or the July 6, 1966 filing date of British Provisional application 31832/66, both of which are claimed by Struthers.

1. Ganiaris A Filing Date

The declaration of the Ganiaris B application, upon which the '722 patent issued, claims benefit under 35 U.S.C. §120 of the Ganiaris A application (Ex. 14, p.9). Under § 120 the '722 patent qualifies for this treatment if its invention was disclosed in the manner provided in the first paragraph of § 112 in the Ganiaris A application; that is to say, the Ganiaris A application must contain an adequate description of the '722 patent. This it fails to do.

Nestle urges that clause d of '722 claim 1 (which is also included in claim 2 by dependency) requires means to provide a flow rate through each crystallizer of greater than 40% per hour of the volume of each crystallizer and that, as held by the Board of Appeals, the applicant "has disclosed no structure

of a means for providing such specific rate". Ex parte Ganiaris, Appeal No. 892-51, April 1, 1969 (Ex. 13, p. 52). I have concluded that res judicata effect should not be given to that ruling, and it is unnecessary to decide whether the Board of Appeals was correct. The Ganiaris A application fails in other respects to contain a written description of the invention.

If the invention lies in the flow rate, the description is deficient. Ganiaris A discloses that "the entire volume of the freeze concentration system (pipe lines, tanks, crystallizers, etc.)" -- not just the crystallizer alone -- "should be less than 2.5 times the hourly flow rate through the system" (Ex. 13, p. 5). Thus, even if one can regard the Ganiaris A disclosure as amounting to a teaching that the flow rate should be greater than 40% of the volume, it is the

volume of the entire system, and not the crystallizer alone, which is specified. This can result in a very substantial difference and compels the conclusion that the specification does not describe the invention claimed in the '722 patent.

If the invention lies in the requirement that the ratio of volume to heat transfer surface area of the crystallizer means be "sufficient to avoid precipitate formation from coffee" (as claim c of the '722 claim requires), the description is also deficient. The disclosure is, instead, that precipitation is time-dependent, but that is controlled by flow rate (which in turn determines residence time). There is no disclosure that any ratio of volume and area can or will avoid precipitation.

Moreover, the Ganiaris A application as filed taught that "a relation of heat transfer area to volume for a

crystallizer must be determined in order to insure a maximum crystal growth rate without precipitate formation ... [which] has been found to be a ratio between 1:7 to 1:10 for the area of the heat transfer surfaces to the volume of the freeze concentration system" (Ex. 13, p. 6). The Ganiaris B application, in marked contrast, discloses that the ratio of area to volume should instead be 7:1 to 10:1 (col. 1, lines 51-58). Thus, even if the indefiniteness of patent claim clause c be ignored, and it further be assumed that one can look to the specification for guidance, it remains that the '722 patent teaches the essential ratio of area to volume must be between 7 and 10, while the otherwise parallel passage of Ganiaris A teaches that the ratio must be between 0.14 to 0.10 (1:7 to 1:10). Ganiaris A, therefore, does not contain a description

of the alleged invention claimed in the '722 patent which meets the requirements of § 112.

As noted in Part V(B)(2) above, the Ganiaris A application is self-contradictory and confusing. As filed, it taught an area to volume ratio of 1:7 to 1:10; but on subsequent pages it inconsistently taught a volume to area ratio of 1:7 and 1:10. There is nothing in the specification to clear up or to resolve this confusing ambiguity. The original claims of Ganiaris A (Ex. 13, p. 9), however, specified that the area to volume ratio be within that range -- and that is the very converse of what Ganiaris B calls for. As was remarked in Chemithon Corp. v. Procter & Gamble Co., 287 F. Supp. 291, 305 (D. Md. 1968), aff'd per curiam, 427 F.2d 893 (4th Cir. 1970):

In such a situation, the public does

> not know what the invention is, Schriber-Schroth Co. v. Cleveland Trust Co. 305 U.S. 47, 58 ... (1938), and the disclosure contradicts itself and furnishes no guide to the art. Grasselli Chemical Co. v. National Aniline & Chemical Co., 26 F.2d 305, 307-08 (2d Cir. 1928); see also, 4 Deller's Walker on Patents, §236. Even assuming that the disclosures of the parent application hinted at the characteristics [claimed in the later application], still the statutory requirements have not been met.

The purpose of the written description requirement of § 112, which is embodied in § 120, is to ensure that the applicant was in possession, as of the filing date of the earlier application, of the invention he claims in the later application and for which he claims benefit of the earlier filing date. Application of Wertheim, 541 F.2d 257, 262 (CCPA 1976); Rengo Co. Ltd. v. Molins Machine Company, Inc., supra, slip op. at 32. Here, it cannot be said that the content of the Ganiaris A application, and its original claims,

were for the "invention" described and claimed in the later Ganiaris B case. Consequently, the '722 patent is not entitled to benefit of the filing date of Ganiaris A.

2. British Application Filing Date

The Ganiaris A application claimed benefit under 35 U.S.C. § 119 of British Provisional application 31832/66, filed July 15, 1966 (Ex. 13, p. 20). The Ganiaris B application referred to the British application but could not (and did not) claim benefit of its filing date (Ex. 14, p. 9). § 119 requires that the domestic application, if it is to have benefit of the foreign application date, must be filed within twelve months of the earlier foreign application for the same invention. Ganiaris B was filed in November, 1969, more than twelve months

after the July, 1966 British Provisional application.

Consequently, the '722 patent could carry its effective filing date back to the British filing date only if (1) Ganiaris B were entitled under § 120 to benefit of Ganiaris A (which, I have concluded, is not the case), and (2) the British application were for the same invention as both Ganiaris A and Ganiaris B (which is also not the case).

The British Provisional application (Ex. 13, pp. 21-28) describes a volume to area ratio of 1:7 to 1:10 feet. That, however, is not the same invention described and claimed in Ganiaris A as filed (Ex. 13, p. 9). Consequently, Ganiaris A could not, under § 119, have benefit of the British Provisional application.

Thus, the '722 patent is not entitled to benefit of the British date, both

because the patent is not entitled to benefit of the Ganiaris A date and because Ganiaris A is not entitled to benefit of the British date. It matters not that Ganiaris B may contendably be for the same invention as the British Provisional, because Ganiaris B was filed more than twelve months after the British case was filed.

3. Invalidity of the '722 Patent under §102(d)

The declaration forming part of the Ganiaris B application refers to Canadian application 994,720, filed July 5, 1967 (Ex. 14, p. 9). That application became Canadian patent 811,389 (Tab T). Claim 1 of the Canadian patent reads:

> 1. In an apparatus for the concentration of an aqueous coffee solution containing from 20 to 45% coffee solids, a crystallizer having heat transfer surfaces to form ice crystals therein, the ratio of the

> total volume of said crystallizer to the area of said heat transfer surfaces being between 1:7 to 1:10 and means to provide a flow rate of said coffee solution through said crystallizer of greater than 40% per hour of the volume of said crystallizer.

Struthers has thus patented in Canada an invention which gives every appearance of being the same invention claimed in the '722 patent, on a Canadian application filed in July, 1967, more than twelve months before the November, 1969 application for the '722 patent was filed in the United States. Nestle argues that since the '722 patent is not entitled to benefit of the filing date of any application prior to the Ganiaris B application, the '722 patent is invalid under 35 U.S.C. § 102(d).

Struthers has not contested Nestle's contention that there is no patentable distinction between the invention patented in Canada and the invention

patented in the '722 patent, Consequently, it is unnecessary to address that point. Struthers simply relies upon its position that the '722 patent is entitled to the filing date of the British Provisional application and therefore the Canadian patent is not a proper reference under § 102(d). Having held that the '722 patent is not entitled to the earlier filing date, it follows that the '722 patent is invalid under § 102(d), and summary judgment of invalidity will be entered on that ground.

4. Invalidity of the '722 Patent under § 102(b)

Nestle also contends that the '722 patent is invalid over Struthers' Svanoe patent 3,285,021 (Tab N), which issued November 15, 1966, more than one year prior to the Ganiaris B application. 35 U.S.C. § 102(b). The filing date of the

Svanoe patent is November 5, 1962, which is well prior to the 1967 filing date of Ganiaris A, the 1966 filing date of the British Provisional application, the 1965 reduction to practice date alleged for the '722 patent in Struthers' supplemental answer to Interrogatory 62, and the April, 1964 invention (conception) date alleged in the supplemental answer. Consequently, the Svanoe patent is available to invalidate the '722 patent under § 102(e), as well as § 102(b).

Svanoe Canadian patent 699,247 (Tab S), which is a counterpart of the United States Svanoe patent, issued December 1, 1964, which is more than one year prior to the filing date of Ganiaris B, Ganiaris A and the British Provisional application. The Canadian patent is, therefore, available to invalidate the '722 patent even if the latter were

entitled to benefit of the filing dates of Ganiaris A and the British case.

However, in view of the fact that I have concluded that the '722 patent is invalid under § 112 and § 102(d), it is unnecessary to determine whether, in the light of the facts as to which there can be no issue, the '722 patent is also invalid under § 102(b), as patented or described in a printed publication more than one year prior to the date of the United States application. Similarly, it is unnecessary to determine whether, on the basis of the same facts, the '722 patent is invalid as obvious under § 103.

I. Invalidity of the '722 Patent by Reason of Prior Sale

In Part V C of this opinion I have set forth the factual data upon which Nestle urges and Struthers resists

summary judgment on the ground of prior sale or offer of sale under 35 U.S.C. § 102(b). I have decided not to rule on this contention for two reasons. First, it is unnecessary since I have already concluded that the '722 patent is invalid on two other grounds. Second, the '722 patent is so unclear, and the various Struthers assertions as to what, in fact, is the claimed invention are so diverse, it would be an unduly cumbersome exercise to match it all against what was offered and/or sold to General Foods.

J. Conclusion

For the reasons set forth above, Nestle's motion for summary judgment of invalidity of the Howell '126 patent will be granted on the ground that it is obvious over the prior art, and Nestle's

motion for summary judgment of invalidity of the Ganiaris '722 patent will be granted on the grounds that it fails to meet the requirements of 35 U.S.C. §112 and that by reason of Canadian patent 811,389 it is invalid under 35 U.S.C. §102 (d).

Counsel for Nestle are requested to prepare a form of order which will implement the conclusions set forth in this opinion and the various determinations which I made from the bench at the four hearings on these motions. The order shall not contain detailed recitals of the factual or legal contentions of the parties. It shall set forth the grounds on which summary judgment was granted as to each patent, the grounds as to which summary judgment was denied as to each patent and, as to each patent, the grounds for summary judgment upon which I did not rule.

It appears to me that if an appeal is to be taken from the order implementing this opinion it would be appropriate that this be done prior to the trial of the remaining second Count of the counterclaim. Should this course be pursued, the form of order should include proposed findings pursuant to Fed.R.Civ.P. 54(b), Curtis-Wright Corp. v. General Electric Co., 446 U.S. 1 (1980); Allis-Chalmers Corp. v. Philadelphia Electric Co., 521 F.2d 360 (3d Cir. 1975).

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83-132

No. _____

IN THE

Supreme Court of the United States

OCTOBER TERM, 1983

STRUTHERS PATENT CORPORATION,
STRUTHERS WELLS CORPORATION and
STRUTHERS SCIENTIFIC & INTERNATIONAL CORPORATION,

Petitioners,

–against–

THE NESTLE COMPANY, INC.,

Respondent.

APPENDIX TO PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE THIRD CIRCUIT

Appendix Pages A-509 – A-683

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UNITED STATES COURT OF APPEALS
FOR THE THIRD CIRCUIT

STRUTHERS PATENT CORPORATION,	:	
Appellant,	:	
v.	:	
THE NESTLE COMPANY, INC.,	:	
Appellee,	:	Appeal No. 82-5355
v.	:	
STRUTHERS WELLS CORPORATION AND STRUTHERS SCIENTIFIC & INTERNATIONAL CORPORATION,	:	
Appellants	:	

APPELLANTS' PETITION
FOR REHEARING IN BANC

Appellants, Struthers Patent Corporation, Struthers Wells Corporation and Struthers Scientific & International Corporation (collectively "Struthers"), respectfully request an *in banc* rehearing of this appeal pursuant to Rule 40,

F.R.A.P. The rehearing is requested in view of a Judgment Order entered by the Court on March 28, 1983 affirming without comment a summary judgment of invalidity of ten United States patents owned by Struthers.*

Rehearing in banc is requested because the basis on which summary judgment was granted by the district court is wholly inconsistent with and contrary to the procedures for summary judgment established by this Court in Tomalewski v. State Farm Life Insurance Co., 494 F.2d 882 (1974) and Federal Laboratories, Inc. v. Barringer Research Limited, 696 F.2d 271 (3rd Cir. 1982)

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* Judgment was entered by the district court for the District of New Jersey on May 6, 1982. The opinion below has been reported at 211 U.S.P.Q. 1023 and appears in the Joint Appendix (JA) at JA 41.

among others. The district court decision, affirmed herein, renders meaningless the "slightest doubt" test espoused for this Circuit in Tomalewski and virtually ignores the Court's instructions in Federal Laboratories that on summary judgment courts are not permitted to disbelieve the good faith statements of experts made in affidavits.

It is safe to say that the decision below is both unprecedented in its scope and startling in that nothing in the case law of the Third or any other Circuit would lead one to expect that summary judgment could properly be granted given the facts in the present case. In Federal Laboratories, supra (page 274), this Court warned that ". . . summary judgment is 'not ordinarily appropriate for the disposition of a patent case,' and should therefore be employed with

great caution."* The safeguards which this Court has provided in Federal Laboratories and numerous other cases to prevent the substitution of summary judgment for a trial on the merits have not been observed herein with the resultant loss to Struthers of a substantial property right in ten patents without benefit of trial by jury as requested. The result reached below and affirmed herein calls for further consideration by the Court if it is to secure and maintain the uniformity of its decisions. Third Circuit Internal Operating Procedures, Ch. VIII B (1980).

We respectfully request the Court to consider the following aspects of this case when considering the petition:

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* Emphasis is supplied herein unless otherwise noted.

1. In the Federal Laboratories case, supra (page 274), this Court held that a court "is [not] . . . at liberty to disbelieve the good faith statements of experts contained in depositions and affidavits and presented by the non-moving party.". Yet the district court below chose to disregard or disbelieve the uncontradicted sworn statements of Struthers' expert, Ganiaris, made in five affidavits submitted in opposition to the motions for summary judgment. Ganiaris, a professional chemical engineer who was in charge of Struthers' projects for the construction of freeze concentration plants for the General Foods Corporation, discussed the differences between the inventions disclosed and claimed in the patents in suit and the prior art cited by The Nestle Company and gave the reasons why these inventions would not be

obvious to one of ordinary skill in the art.

2. The district court below held that it was able to read and understand the subject matter of the patents in suit without the aid of expert testimony. But District Judge Latchum earlier held in Struthers Scientific & Int. Corp. v. General Foods Corp., 314 F.Supp. 313, 315 (D. Del. 1970), on a motion for summary judgment involving three of the same patents here in suit (patents Nos. 3,381,302; 3,404,007; and 3,449,129):

> "Were this Court skilled in the art it might be a simple matter to answer the questions required by the John Deere case, but this Court frankly admits that it lacks that special knowledge which would permit it to read the patents in suit so understandably, in terms of obviousness to a man of ordinary skill in the art, on the basis of the present record."

Since the only expert testimony before the court in addition to that before Judge Latchum was that of Ganiaris, the

clear implication of this is that the court made itself its own expert in the field and, on that basis, resolved the factual inquiries mandated by the Supreme Court in determining questions of obviousness under 35 U.S.C. § 103 in Graham v. John Deere & Co., 383 U.S. 1 (1966). This Court has cautioned that in summary judgment cases "...the court must be certain that it does not need any expert testimony or other extrinsic evidence to explain or evaluate . . . " the patents and prior art. Borden Co. v. Clearfield Cheese Co., 369 F.2d 96, 101 (3rd Cir. 1966).

3. The district court, based on its own interpretation of unexplained documents from the Struthers-General Foods lawsuit, held that Ganiaris had sworn falsely in his affidavits in connection with matters relating to alleged prior sales (35 U.S.C. § 102(b))

of the patented processes. But this Court held in Ness v. Marshall, 660 F.2d 517, 519 (3rd Cir. 1981), that "courts should not draw factual inferences in favor of the moving party and should not resolve any genuine issues of credibility." The Court's instruction in Ness v. Marshall is particularly pertinent here where Nestle submitted no affidavits or other sworn testimony to controvert Ganiaris. Thus, Ganiaris' credibility was judged, unfairly, without the benefit of further explanation or discussion by the witness such as would occur at trial.

4. In Tomalewski, supra (page 884), this Court held that summary judgment was a "drastic remedy" which "may not be granted where there is the slightest doubt as to the facts." If the slightest doubt test had been applied in the case at bar then summary judgment should have

been denied on the basis of the following material facts of record:

a. Struthers has shown that the "dewaxing" problem addressed by its patents persisted despite continued efforts to effect a solution for at least nine months after the time that the district court below held that it was so "easily" solved and sold to General Foods in May 1964 (Struthers Br. 16-27).* An inference favorable to Struthers may be drawn from this fact, as the mandate of this Court instructs on summary judgment, that the invention was not completed and, therefore, not sold

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* Reference is to Brief For Appellants (Struthers).

under 35 U.S.C. § 102(b) at the time the district court held.

b. An inference favorable to Struthers may be drawn from the fact that General Foods filed a patent application on dewaxing in June 1966 (JA 2317), long after the time the district court found it had been sold to General Foods (Struthers Br. 26-27). General Foods acknowledged in a letter from its Executive Vice President to Struthers' Chairman that the wax removal process was regarded by General Foods as "essential to successful operation of your [Struthers' FreCon] system" (JA 1039);

c. The record evidence supported Ganiaris' sworn statement that prior to January 1965, General Foods did not "appreciate" that a dewaxing operation was necesary, a

statement which the district court below held to be "patently false" (JA 236). The facts, however, conclusively demonstrate that Struthers' mobile FreCon plant had no dewaxing facilities (JA 1954); dewaxing equipment was not included in the initial contract with General Foods of August 12, 1964 (JA 1361), nor was it included in the freeze concentration plant which Struthers designed and built for General Foods in December 1964 (JA 1391-97); the problem with wax continued at General Foods at least until February 1965 when Ganiaris noted that "This problem did not receive the proper attention from either organization, MH [Maxwell House] or SSI" (JA 1393-96). Can it be said that these facts do not meet the "slightest doubt" test as

expressed in Tomalewski, particularly where the reputation of the expert, Ganiaris, is involved? The reasonable inferences to be drawn from these facts were not viewed by the district court in the light most favorable to Struthers, the party in opposition to the motion, as this Court has instructed. Goodman v. Mead Johnson & Co., 534 F.2d 566, 573 (3rd Cir. 1976);

d. Is there not the slightest doubt with respect to the facts which showed that Struthers' contract of August 1964 with General Foods was for the sale of freeze concentration equipment only and that no freeze drying equipment was sold at that time (Struthers Br. 28-29, 41-44)? The district court's assumption, on the basis of a hearsay statement by an unknown General Foods engineer,

that General Foods intended to use the Struthers freeze concentration equipment in conjunction with freeze drying, constituted the drawing of an inference against Struthers in a situation where intent was a substantive element of the "on sale" defense. This has been held by this Court to be impermissible on summary judgment. Ness v. Marshall, supra (page 519). Moreover, in the earlier lawsuit between Struthers and General Foods, counsel for General Foods denied that it used the same temperature range for freeze drying which is stated in the claims of the Muller patents (Struthers Br. 32). This Court has also held that there must be substantial identity between that which was sold and the claims of the patent for there to have been a prior sale under 35 U.S.C. § 102(b).

DeLong v. Raymond International, Inc., 622 F.2d 1135, 1141 (3rd Cir. 1980).

5. In Federal Laboratories, supra, this Court held that a court is not permitted to disbelieve the good faith statements of experts made in affidavits on a motion for summary judgment. We therefore ask: Why did this Court insist in that case that Dr. Barringer's sworn statement, in which he stated that the prior art cited by Federal was not analogous to that disclosed in the patent in suit, be believed, and similar treatment not be accorded Struthers' expert, Ganiaris?

Ganiaris made the same types of analyses in his affidavits as those made by Dr. Barringer in the Federal Laboratories case. For example, Ganiaris analyzed the differences between freeze concentration processes used in

concentrating orange juice and that of coffee (the subject of the patents) and stated that they were not analogous. This was important when considering obviousness over prior art relating to processes for orange juice. Ganiaris said in his affidavits:

> "21. The problems faced by the coffee industry are substantially different from other producers of concentrated beverage products. In the orange juice industry, for example, orange juice is concentrated in order to simplify and decrease the cost of shipping orange juice product, a result accomplished by freeze concentration covered by several patents which have been cited in this case. Fresh orange juice, however, has approximately 8 to 12 percent dissolved materials, and this will not vary as with coffee extract. The feed of freshly-squeezed orange juice into a freeze concentration system, therefore, is always within this narrow range of solids.
>
> "22. Furthermore, the viscosity of freshly- squeezed orange juice solution is considerably lower than that of coffee extract as normally contained in commercial coffee extraction processes. It is well known that the formation and growth of crystals and subsequent separation

of the crystals from concentrated liquor are affected by the viscosity of the liquor. The habit (shape), size, size-distribution and rate of growth of the crystals depends upon the viscosity of the solution. In general, for high viscosities, crystals are small and separation is extremely difficult.

"23. In addition, the chemical composition of the dissolved matter in orange juice is entirely different from that of coffee. It is well known that even minute chemical differences can have a profound effect on the habit of the crystals during crystalization. Thus, the data for the formation of ice crystals in an orange juice solution cannot be extrapolated to encompass coffee extract. The chemicals in one case may be occluded in the crystal lattice so that no washing can remove such impurities or the chemicals may inhibit the growth of the ice crystals in one direction (flat-plates, middles, etc.) and thus separation becomes uneconomical.

"24. In short, it is readily apparent that orange juice concentration disclosures are not relevant prior art with respect to coffee. The choice of operating conditions for freeze concentrating coffee extract cannot be based upon experience with orange juice. Clearly, one with ordinary skill in the art of concentration of orange juice cannot (by performing experiments on orange juice) derive the optimum conditions for producing

discrete ice crystals and thereafter separating them from coffee extract efficiently in a manner which will result in commercial soluble coffee product." (JA 4230-31)

Ganiaris also discussed the differences between the prior art cited by Nestle, without benefit of expert commentary, and the patents in suit. He said:

"The '007 Patent is Different From Sperti 2,558,337 ('337) (Answering Nestle Br., p. 60)

"28. The '007 patent claims an invention which is quite different from that of Sperti '337. Sperti relates to concentration of orange juice only, and not to coffee product. As shown above, there is no way to extrapolate results from orange juice to coffee and experimentation with orange juice would have no value in providing an accurate prediction as to the results in a process for manufacturing coffee according to the '007 patent.

"The '007 Patent is Different from Clinton Ser. No. 830,195 ('195) (Answering Nestle Br., pp. 39-41, 69)

"29. The '195 Clinton application is quite different from that of the Muller '007 patent. First, the Clinton application does not specify the 1-5 percent moisture

content of the final coffee product, the importance of which is explained above. Second, the separation of the ice crystals from the coffee extract in Clinton is broadly defined, whereas the '007 patent is limited specifically to centrifugation, a technique which contributed to Muller's unique results." (JA 4233-34)

* * *

"The Flosdorf 2,471,677 ('677) Patent is Not the Same as Muller '007 (Answering Nestle Br., p. 81)

"32. The Flosdorf '677 patent discloses a freeze concentration process for orange juice. For the reasons stated above, patents concerning processes for manufacture of orange juice are of no value in determining what will happen with coffee due to the vast differences of these products. Furthermore, the Muller '007 patent refers to freeze concentration of coffee extract from 10 to 30 percent solids up to 30 to 50 percent solids by forming discrete ice crystals, separating them from coffee extract by centrifugation and washing the crystals with fresh water. On the basis of the above differences between orange juice and coffee extract, the Flosdorf '677 patent is not prior coffee art." (JA 4235)

* * *

"Bassett 529,202 ('202) is Not Prior Art as to Muller '007 (Answering Nestle Br., p. 16)

"43. The Bassett '202 patent refers to dilute solutions which could be less than 10% coffee solids. Nowhere does Bassett disclose any concentrations of 10-30% coffee solids. The coffee infusion as prepared by Bassett is similar to coffee made in a household percolator and such coffee solutions normally have less than 5% coffee solids. (JA 4239)

* * *

"Ganiaris '295 Is Not Invalid Over the Prior Art (Answering Nestle Br., pp. 39, et seq.)

"7. Sivetz (Nestle Tab R) does not show steps (a), (b) and (c) of claims 1 and 3 of the '295 patent. He simply mentioned the operations involved without showing the interelationship required for the process to function. For example, on page 15 of the Sivetz reference, he shows a phase diagram which clearly indicates that the ice-phase has large quantities of occluded coffee solids. If this phase diagram were correct, centrifuging and washing would not purify the ice beyond the limits set by the equilibrium lines. Struthers' research has proven that pure discrete ice crystals can be grown in coffee solutions without any occlusion. There is no prior art (patents, publications or anything

else) which shows what Struthers discovered and disclosed in patents ith respect to this phenomenon." (JA 4273-74)

* * *

"10. The Reimus inventions offered solutions to these problems. First, Reimus recognized differences between the 'waxy' materials that were removed at high temperatures (over 100 degress F.) and the precipitate that was formed at low temperatures (80 degrees to 32 degrees F.). Reimus found that

"a. The low temperature precipitate was a mixture of 'waxy' materials (with no effect on taste) and coffee components which were needed for making a good quality (flavor and aroma) product; and

"b. The ratio of the 'waxy' materials to the 'desirable' coffee components in the precipitate depended on the cooling technique of the extract.

"11. After having recognized these differences, Reimus offered specific solutions as seen in his patents. The Reimus inventions have been used in industrial applications for manufacturing millions of pounds of coffee. Furthermore, his inventions were not obvious, even to people closely involved with the freeze concentration and freeze drying technology related to coffee at the time the inventions were made. Reimus' discovery that the

precipitate was a mixture of 'waxy' materials and 'desirable' coffee solids and his method of wax removal were true contributions to the art." (JA 4288)

* * *

"The Reimus Patents Are Valid Over Prior Art

"27. Zorn 1,507,410 (cited by Nestle Br., pp. 8-12, 773-4) discloses a process for eliminating the undesirable elements which, upon standing, cause the chemical or other changes which break down the flavor of coffee concentrate. Reimus '302, on the other hand, discloses a process for eliminating the 'waxy' materials to avoid the plugging of the centrifuge and preventing the removal of 'desirable' coffee components.

"28. The key question is whether the 'undesirable' elements of Zorn are the same as those of Reimus. Obviously, neither patent discloses the composition of these materials, because it is impossible to do so when dealing with a natural product reduced to extract by various techniques. However, from the specification of these patents, it is clear Reimus refers to an extract which has been produced by an entirely different processing technique from the infusion of Zorn. The Reimus extract has been produced at high temperatures (250 degree F. to 350 degree F.) and chemical reactions have caused the generation

of polymeric substances which Reimus defines as tars or 'waxy' materials. Reimus' concentrations of 10-40% dissolved coffee solids clearly indicate production of extract by hydrolysis (chemical reaction) which takes place only at high temperatures.

"29. By contrast, Zorn's extract is an infusion produced with water which is hot but below the boiling point of water. It is known that at such a temperature hydrolysis can not proceed and, thus, the tars and 'waxy' materials can not be produced.

"30. The Zorn 'undesirables' are therefore entirely different from the Reimus 'waxy' type materials. The processes can not be compared because the materials to be eliminated and the reasons for removing them are entirely different. Indeed, Zorn discloses a process which, if applied to the coffee extract of Reimus, will cause precipitation and removal of most of the desirable coffee solids.

"31. Zorn 1,636,890 patent (cited at Nestle Br., p. 28) discloses a process for eliminating the 'undesirable' elements from fruit juices. This process is completely foreign to the coffee extract treated by the Reimus patent for reasons stated in my Group I affidavit (Para. 21-24).

* * *

> "34. Frederickson 2,410,157 (cited at Nestle Br., p. 9) discloses a process for removing deleterious waxes but he shows no high temperature extract. Reimus '302 describes a process for removing the high temperature 'waxy' type materials and preventing the removal of desirable coffee solids that affect flavor. In addition, Frederickson '157 does not disclose the concentrations of the extract or that he proceeds to dehydrate or freeze concentate the extract." (JA 4294-96)

All of the sworn statements made by Struthers' expert, Ganiaris, were uncontroverted and unopposed except for attorney argument which clearly is not evidentiary in nature. Such statements, if made in good faith, must be believed. Federal Laboratories v. Barringer Research Ltd., supra. Where there is the "slightest doubt" as to material facts, summary judgment must be denied. Tomalewski v. State Farm Life Insurance Co., supra. These rules were not followed by the district court in granting summary judgment herein nor was

the court's decision consistent with those prior binding decisions of the Third Circuit.

The principle stated by the Supreme Court in Poller v. Columbia Broadcasting System, Inc., 368 U.S. 464, 473 (1962), is most apposite here: ". . . It is only when the witnesses are present and subject to cross-examination that their credibility and the weight to be given their testimony can be appraised. Trial by affidavit is no substitute for trial by jury which so long has been the hallmark of 'even handed justice'".

For the reasons given above, Appellants respectfully request that this

Court grant its petition for a rehearing *in banc*.

Respectfully submitted,

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STATEMENT OF COUNSEL

I express a belief, based on a reasoned and studied professional judgment, that the panel decision is contrary to decisions of the United States Court of Appeals for the Third Circuit or the Supreme Court of the United States, and that consideration by the full court is necessary to secure and maintain uniformity of decisions in this Court, to-wit, the panel's decision is contrary to the decisions of this Court set forth in Federal Laboratories, Inc. v. Barringer Research Limited, 696 F.2d 271 (1982) and Tomalewski v. State Farm Life Insurance Co., 494 F.2d 882 (1974).

For The Petitioners

Sidney R. Bresnick

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF NEW JERSEY

STRUTHERS PATENT CORPORATION,	
Plaintiff,	Civil Action No. 663-72.
v.	AFFIDAVIT IN OPPOSITION TO NESTLE'S MOTION FOR PARTIAL SUMMARY JUDGMENT (GROUP I)
THE NESTLE COMPANY, INC.,	
Defendant,	
v.	(EXHIBITS NOT INCLUDED)
STRUTHERS WELLS CORPORATION, and STRUTHERS SCIENTIFIC AND INTERNATIONAL COPORATION,	
Additional Defendants on Counter-claim.	

STATE OF NEW YORK)
) ss.:
COUNTY OF NEW YORK)

NEOPHYTOS GANIARIS, being duly sworn, deposes and says:

1. I joined Struthers Scientific & International Corporation ("Struthers Scientific" individually; collectively with Struthers Patent Corporation and Struthers Wells Corporation referred to as "Struthers") in 1962 and have been employed by it to date in various positions relating to research and development in the field of crystallizers and ice crystallization, primarily in connection with the manufacture of soluble coffee products. I make this affidavit in opposition to Nestle's motion for partial summary judgment of invalidity and/or unenforceability of Muller patents 3,404,007 (the '007 patent) and 3,495,522 (the '522 patent), also known as Nestle's Group I motion.

2. I hold a B.S. in Chemical Engineering granted by Purdue University in 1957 and an M.S. in Chemical Engineering granted by New York

University in 1960. In addition, I did graduate work toward a Doctorate in Chemical Engineering at New York University from 1960 to 1964.

3. I was employed by New York University as a research assistant from 1961 to 1962 and as a teaching assistant from 1957 to 1960 in Chemical Engineering.

4. I was employed by E.I. du Pont de Nemours and Co. as a research engineer from 1960 to 1961.

5. I was responsible for the design and installation of a plant sold to General Foods Corporation ("General Foods") by Struthers in 1964 and I provided technical assistance in the sale of this system.

6. I am registered as a Patent Agent to practice before the United States Patent and Trademark Office ("Patent Office"), having passed the examination given by the Patent Office after meeting

the qualifications to take such examination.

Background

7. Struthers Wells Corporation ("Struthers Wells") was formed in 1928 to take over the assets and business of three companies which had been in existence since 1851, 1860 and 1896, respectively. Presently, the business of Struthers Wells consists principally of the manufacture of process equipment for the chemical petroleum and electrical utilities industries.

8. In 1942, Struthers Wells acquired the exclusive rights for the United States and Canada with respect to the patents, know-how and experience that were originated by a Norwegian company, A/S Krystal, relating to the crystallization of chemical solutions for the purpose of separating specific

components. Thereafter, Struthers Wells developed improved crystallization equipment employed throughout the processing, refining and chemical industries for the crystallization of a great number of inorganic and organic chemicals, ranging from high tonnage heavy chemicals such as ammonium sulfate, ammonium phosphate, potassium chloride and sodium chloride to specialty items such as silver nitrate and fumaric acid. In 1958, development work began to apply the laws and principles practiced in the controlled crystallization process to the broad field of ice crystallization.

9. In 1961, Struthers Scientific was formed to take over certain assets and business from the parent company, Struthers Wells. The entire business and technology relating to crystallization process and equipment was acquired by Struthers Scientific from Struthers Wells.

10. Struthers Scientific continued the development work on crystallization and became one of the leading manufacturers of crystallizers in the world. The company's crystallizers are found in most major chemical and petrochemical complexes on the globe, including the Soviet Union and Eastern European countries.

11. With respect to ice crystallization, in 1962 Struthers Scientific initiated pilot plant studies for food product and beverage applications. Several products such as orange juice, vinegar, apple juice, tea and coffee extract were investigated. By 1963, Struthers Scientific had developed a system ("FreCon") which appeared to have the potential for commercialization.

12. In 1964, a sales contract with General Foods was signed for the first semicommercial freeze concentration plant

for manufacture of coffee extract. In 1965, the company sold another plant to General Foods, and later sold two plants to Deutsche Entrakt Kaffee, Gmbh in Germany and one plant to Cocam in Brazil. At present, I do not know whether these plants still freeze concentrate coffee extract.

13. Annexed hereto as Exhibit A is Struthers Scientific annual report for 1980 and accompanying letter to Shareholders they clearly indicate that crystallizers continue to be a major business for Struthers Scientific (see letter to Shareholders). Annexed as Exhibit B is the enclosed bulletin on KRYSTAL crystallizers which sets forth a long list of companies using this piece of equipment.

Introduction to Soluble Coffee Production

14. Soluble coffee products, also known as "instant coffee", have been sold commercially for many decades. The object of instant coffee is to reduce the time and other requirements for brewing a beverage type coffee from roasted and ground coffee beans. All producers of instant coffee strive to provide a soluble coffee product which, when dissolved in water, will resemble as much as possible the taste and aroma of freshly brewed coffee products. Obviously, there is also the economic consideration of producing such coffee at the lowest possible price.

15. Soluble coffee products have been produced in the past by many different methods. The method used can and usually does materially alter the taste and physical properties of the final soluble coffee product. For

example, a comparison of spray dried "Nescafe" with freeze dried "Tasters Choice", two soluble coffee products of The Nestle Company, Inc. which both result from methods of removal of soluble materials from ground roasted coffee beans, reveals differences in physical properties and the taste. These differences are in the physical properties as well as the chemical composition and are not easily definable.

16. After blending of coffee beans and roasting the blend, substantially all methods of producing soluble coffee products start with the extraction of soluble materials from roasted ground coffee by forcing hot (250° to 350°F) water or steam through the coffee grounds in an extractor and collecting the hot water with coffee solids dissolved therein. This is referred to as coffee extract or liquor. Commercial coffee

extract usually contains from 10% to about 30% of soluble coffee solids. As the percentage of coffee solids in the extract increases, the viscosity of the extract increases to a point where, in commercial extraction, the extract can have the viscosity of molasses or the like. By contrast, normal home brewed coffee is far less viscous, containing only about 3 to 5 percent coffee solids.

17. There are on the order of 300 different chemical compounds contained in commercial coffee extract, Such compounds vary from one blend to another depending upon the coffee beans used. Some of these compounds can react with each other, and can volatilize because they have a boiling point lower than that of water or can precipitate due to chemical reaction. Such reactions are dependent upon time and temperature, as well as upon the concentration of the extract.

18. After extraction, the coffee liquor is treated by one of many known processes to provide the final dry soluble coffee product. These processes include (i) direct spray drying of the extract, (ii) freeze concentration of the extract to provide a concentrated liquid coffee product as an end element, (iii) freeze drying of the extract, (iv) freeze concentration followed by freeze drying of the extract, and (v) drum drying. As stated above, the product resulting from each of these processes differs in physical properties and taste from process to process. In addition, the physical properties and the taste of the final product differ depending upon the beans, the concentrations at various steps of the process, temperatures, holding times and other factors.

19. Prior to Struthers' inventions, persons involved with manufacture of

soluble coffee products were of the opinion that pure ice crystals could not be formed when coffee extract was cooled to the point where the solvent (water) froze, because (they believed) either a non-crystalline ice would form or, if crystals did in fact form, the coffee solids would be occluded therein and therefore not susceptible to removal from the crystals by washing, centrifugation or the like.

20. The industry also faced critical problems with freeze-drying. For example, a certain amount of moisture must be retained in the final product, but there must not be too much moisture therein. When the amount of moisture in the final coffee product exceeds about 5 percent, the shelf-life of the product decreases rapidly. On the other hand, in order to remove enough moisture so the moisture content is less than 1 percent,

the freeze-drying process must be carried on for such a long period of time that the quality of the soluble coffee product deteriorates. Therefore, the moisture range of about 1 to 5 percent for freeze drying is both economically and qualitatively critical to obtain a commercial soluble coffee product which closely resembles the freshly brewed variety. Over-drying removes volatile flavor, whereas under-drying spoils shelf life and caking may also result.

21. The problems faced by the coffee industry are substantially different from other producers of concentrated beverage products. In the orange juice industry, for example, orange juice is concentrated in order to simplify and decrease the cost of shipping orange juice product, a result accomplished by freeze concentration covered by several patents which have been cited in this case.

Fresh orange juice, however, has approximately 8 to 12 percent dissolved materials, and this will not vary as with coffee extract. The feed of freshly squeezed orange juice into a freeze concentration system, therefore, is always within this narrow range of solids.

22. Furthermore, the viscosity of freshly squeezed orange juice solution is considerably lower than that of coffee extract as normally contained in commercial coffee extraction processes. It is well known that the formation and growth of crystals and subsequent separation of the crystals from concentrated liquor are affected by the viscosity of the liquor. The habit (shape), size, size-distribution and rate of growth of the crystals depends upon the viscosity of the solution. In general for high viscosities, crystals

are small and separation is extremely difficult.

23. In addition, the chemical composition of the dissolved matter in orange juice is entirely different from that of coffee. It is well known that even minute chemical differences can have a profound effect on the habit of the crystals during crystalization. Thus, the data for the formation of ice crystals in an orange juice solution cannot be extrapolated to encompass coffee extract. The chemicals in one case may be occluded in the crystal lattice so that no washing can remove such impurities or the chemicals may inhibit the growth of the ice crystals in one direction (flat-plates, middles, etc.) and thus separation becomes uneconomical.

24. In short, it is readily apparent that orange juice concentration

disclosures are not relevant prior art with respect to coffee. The choice of operating conditions for freeze concentrating coffee extract cannot be based upon experience with orange juice. Clearly, one with ordinary skill in the art of concentration of orange juice cannot (by performing experiments on orange juice) derive the optimum conditions for producing discrete ice crystals and thereafter separating them from coffee extract efficiently in a manner which will result in commercial soluble coffee product.

With the above in mind, I turn to the issues of the subject litigation.

Different Inventions are Claimed in Muller 3,404,007 ('007), Muller II and Muller 3,495,522 ('522) (Answering Nestle Group I Mem. [hereinafter "Nestle Br."], pp. 80-83)

25. The Muller '007, Muller II and '522 claims are for different inventions

because the '007 and Muller II claims are for a process and the '522 claims are for a mechanical apparatus. Many processes other than those claimed in '007 and Muller II can be performed in the apparatus claimed in '522. For example, the '522 apparatus can be used with very dilute coffee extract (less than 10 percent coffee solids), whereas the '007 process and claim 11 of Muller II specify a feed extract of 10 percent to 30 percent coffee solids. Also, the '522 apparatus can be used to dry the final product to more than 5 percent or less than 1 percent moisture or use a temperature range of -45°C. to +50°C. for freeze drying the extract, whereas the '007 and Muller II, claim 11 processes are limited to 1 to 5 percent moisture and a temperature range of -45°C. to zero degrees C. For at least these reasons

the '007 patent and Muller II are not directed to the same invention as '522.

The Muller II Application (Serial No. 738,776) is Different from the '007 Patent (Answering Nestle Br., pp. 55-60)

26. The Muller II application is directed to a different invention from the '007 patent because the Muller II application is limited to freezing the concentrated extract from zero degrees to -45°C., whereas the '007 patent calls for freeze drying at a temperature between zero degrees C. and -45°C. In addition, the Muller II application recovers solids from washings by dehydration. The '007 patent teaches the recycling of the washings to the feed extract prior to freeze concentration. The recycling of the washings shows that the quantity of wash water to be used is limited. (Otherwise the purpose of concentration would be defeated.) By contrast, under

Muller II, large quantities of wash water can be used.

27. The '007 patent also teaches the recycling of the washings to the extraction step. Since extraction requires very hot water, the washings must be heated to a very high temperature and consequently the coffee solids in the washings should be of very low concentration, because otherwise the continuous recycling of coffee solids and repeated heating to high temperature (212 degrees F. and above) would adversely affect the quality of the coffee product. As explained above, such continual heating of the extract would cause chemical reactions to take place which change the physical properties of the final coffee product and cause a deterioration of its taste. The Muller II application does not claim recycling to the extraction step.

The '007 Patent is Different from Sperti 2,588,337 ('337) (Answering Nestle Br., p. 60)

28. The '007 patent claims an invention which is quite different from that of Sperti '337. Sperti relates to concentration of orange juice only, and not to coffee product. As shown above, there is no way to extrapolate results from orange juice to coffee and experimentation with orange juice would have no value in providing an accurate prediction as to the results in a process for manufacturing coffee according to the '007 patent.

The '007 Patent is Different from Clinton Ser. No. 830,195 ('195) (Answering Nestle Br., pp. 39-41, 69)

29. The '195 Clinton application is quite different from that of the Muller '007 patent. First, the Clinton application does not specify the 1-5 percent moisture content of the final

coffee product, the importance of which is explained above. Second, the separation of the ice crystals from the coffee extract in Clinton is broadly defined, whereas the '007 patent is limited specifically to centrifugation, a technique which contributed to Muller's unique results.

30. Third, the temperature range for freeze drying of Clinton is not specified. As noted above, temperature is a very important feature in coffee processing and significantly affects the physical properties of the final product as well as the ultimate flavor thereof. Clinton discloses that the concentrated coffee extract is frozen below the eutectic point and that the coffee product temperature should be below 120 degrees F. Clinton does not indicate what the precise eutectic temperature is for any one coffee product. (This is

probably not known since coffee is a natural product, having about 300 different chemical compounds which vary with the coffee beans used.) Even if the eutectic point for a particular coffee product were known, it would not be a well-defined temperature-concentration point because it would only be applicable in very rare circumstances. In addition, Clinton merely provides for freezing the extract below the eutectic point, which means to any temperature all the way down to absolute zero. Therefore, there is no freezing temperature range which corresponds specifically to the range of zero degrees C. to -45°C taught by the Muller '007, As stated above, the range is important, and if this range were to be carried below -45°C., freeze drying costs mount rapidly.

31. Fourth, Clinton also teaches freeze drying under a vacuum of less than

500 microns. This means that the condenser (condensing the water) could theoretically be at a temperature as low as absolute zero. Clinton again does not define the very necessary range claimed by Muller '007.

The Flosdorf 2,471,677 ('677) Patent is Not the Same as Muller '007 (Answering Nestle Br., p. 8)

32. The Flosdorf '677 patent discloses a freeze concentration process for orange juice. For the reasons stated above, patents concerning processes for manufacture of orange juice are of no value in determining what will happen with coffee due to the vast differences of these products. Furthermore, the Muller '007 patent refers to freeze concentration of coffee extract from 10 to 30 percent solids up to 30 to 50 percent solids by forming discrete ice crystals, separating them from coffee

extract by centrifugation and washing the crystals with fresh water. On the basis of the above differences between orange juice and coffee extract, the Flosdorf '677 patent is not prior coffee art.

The Flosdorf 2,509,681 ('681) Patent Does Not Disclose the Invention Claimed in Muller '007 (Answering Nestle Br., pp. 8-9)

33. The Flosdorf '681 patent discloses freeze concentration of coffee extract and states that such a method is known and requires no further description. Freezing means solidification of the solvent. The Flosdorf '681 patent merely discloses the freezing of coffee extract and solidification of the solvent (water). However, solidification does not mean formation of discrete ice crystals. Ice could be pure water ice crystals or amorphous solidified water or

agglomerated ice crystals with occluded dissolved material. Silence on this point would be expected in the prior art for the reasons stated above with reference to crystal formation in the freeze concentration of coffee. Flosdorf did not expect to obtain ice crystals. The formation of ice crystals of the type set forth in Muller '007 provides that the coffee extract adhere to the surface of the crystals from where it can be washed off and recovered. On the other hand, dissolved solids occluded in an aggregate of ice crystals or in the lattice of the ice crystals cannot be washed off and are not economically recoverable.

34. The effect of this fundamental difference between discrete ice crystals and plain non-crystalline ice was not understood in the prior art. For example, Sivetz (Tab U, p. 15) presents a

phase diagram for coffee extract. The diagram clearly indicates that the solid phase (ice) has a very high content of coffee solids and that the solids are occluded in the solid phase (ice). Thus, even in 1963 (the date of publication of Sivetz' book) after Flosdorf, the art was not clear on how water from coffee extract solidifies and, in any event, certainly did not disclose how to obtain unoccluded ice crystals. The Muller '007 patent teaches the formation of unoccluded discrete ice crystals. This is not found in Flosdorf '681.

35. With respect to concentrations, the Muller '007 patent clearly states just what feed (10 percent - 30 percent) and final concentrate (30 percent - 50 percent) are required. Flosdorf '681 gives no indication of the initial concentration, The statement in column 8, lines 9-13 simply expresses the desire of

having a final coffee extract with a concentration of 50 percent dissolved solids for optimum results. Flosdorf does not disclose that pre-concentration to 50 percent solids can be achieved by freeze concentration or how such freeze concentration step is to be accomplished.

36. Furthermore, the Muller '007 process involves separation of ice crystals by centrifugation, freezing of the concentrated extract to a solid mass and freeze drying it to 1-5 percent moisture at zero degrees to -45°C. None of these critical steps and operating conditions are disclosed by Flosdorf '681.

Irwin 2,292,447 ('447) and Colton 2,751,687 ('687) Do Not Disclose the Invention of Muller '007
(Answering Nestle Br., p. 11, 17 fn.)

37. The Irwin '447 and Colton '687 patents disclose freeze drying in general terms without the critical conditions

enumerated above as claimed in Muller '007.

38. By contrast, the Muller '007 patent discloses freeze concentration of coffee extract under controlled conditions with respect to initial and final concentrations and formation and separation of discrete ice crystals. This process whereby, nonoccluded ice crystals are obtained, is not conventional for coffee extract or obtainable by the procedures disclosed by Irwin and Colton. Furthermore, the '007 patent clearly and critically defines the moisture content (1-5 percent) in the final product and the temperature (zero degrees to -45°C.) for freeze drying coffee.

39. As noted above (¶ 20), the 1-5 percent moisture in the final product is a critical specification of the final product. Any attempt to reduce the

moisture to less than 1 percent by prolonged exposure of the coffee to high temperature would damage the quality of the coffee due to the removal of volatile aromatic components. On the other hand, allowing a moisture content higher than 5 percent of the final product would give a product of limited storage stability.

The Noyes 2,416,945 ('945) Patent is Not Prior Art with Respect to Muller '007 (Answering Nestle Br., pp. 11-12)

40. The Noyes '945 patent discloses a technique for concentrating coffee extract by: (a) freezing the extract to a solid frozen mass and (b) slowly warming the frozen mass until a mixture of ice and concentrated extract are formed. This patent clearly indicates that freeze concentration can be achieved by different techniques. Muller's step by step process must be clearly understood in comparing various

processes. All processes which concentrate coffee extract by freezing cannot be assumed to be one and the same process.

41. In particular, the '007 process does not involve a step for freezing the feed coffee extract (10%-30%) to a solid mass. The '007 patent teaches the formation of the discrete ice crystals within the liquid extract. Moreover, Noyes '945 provides for concentrating very dilute extract. Noyes' infusion is concentrated to 15-20% dissolved solids whereas the final concentrate of the '007 process is 30%-50% solids.

The Cortez 2,852,388 ('388) Patent Does Not Disclose the Inventions of Muller '007 (Answering Nestle Br., p.11)

42. The Cortez '388 patent discloses a process for preparing a tea concentrate by a heating method and subsequently freezing it quickly in order to preserve

its aroma and flavor. There is no intention to freeze concentrate the tea extract. This process is not a freeze concentration method and it has no meaning in relation to the '007 patent or any of the other patents involved in this litigation.

Bassett 529,202 ('202) is Not Prior Art as to Muller '007
(Answering Nestle Br., p. 16)

43. The Bassett '202 patent refers to dilute solutions which could be less than 10% coffee solids. Nowhere does Basset disclose any concentrations of 10-30% coffee solids. The coffee infusion as prepared by Bassett is similar to coffee made in a household percolator and such coffee solutions normally have less than 5% coffee solids.*

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* See also my Group II affidavit, ¶ 10.

Walker 3,156,571 ('571) is Not
Prior Art as to Muller '007
(Answering Nestle Br., p. 60)

44. The Walker '571 patent discloses a process for making orange juice. The same arguments as for Flosdorf '677 are valid. Furthermore, the Walker '571 patent does not disclose the recycling of the washings as was pointed out by Nestle (Nestle Group I Mem., p. 60). It discloses the recycling of concentrated liquor and recovery of solids from the melted ice by evaporation (not from the washings).

Findlay 2,945,903 ('903) is Not
Prior Art as to Muller '007
(Answering Nestle Br., p. 62, fn.)

45. The Findlay '903 patent discloses a process for recovery of paraxylene by fractional crystallization. As was indicated above in comparing orange juice and coffee extract, the chemical composition of the

solvent and materials involved in crystallization have a profound effect on the habit, size and size distribution of the crystals produced and their subsequent separation from the concentrated liquor. Thus, attempting to extrapolate data and concepts from a paraxylene process to coffee extract is considered a futile and improper exercise.

Cole 2,967,778 ('778) is Not Prior Art as to Muller '007
(Answering Nestle Br., pp. 16, 61)

46. The Cole '778 patent discloses freeze concentratio of dilute orange juice. No comparison can be made to the high concentration involved for freeze concentrating coffee extract by the '007 process.

Bedford 2,354,663 ('663) is Not Prior Art as to Muller '007 (Answering Nestle Br., p. 61 [cited in quotation from Sperti case])

47. The Bedford '663 patent discloses washing with liquor for the freeze concentration of orange juice. In the case of coffee extract, the washing with coffee liquor is not feasible. The '007 process uses fresh water for washing.

Food Engineering and Freezing Preservation are Not Prior Art as to Muller '007 (Answering Nestle Br., p. 62)

48. The Food Engineering (Tab S) and Freezing Preservation of Foods (Tab T) references describe processes related to food products other than coffee and are not related to the '007 process.

Ganiaris 3,283,522 ('522) Is Not Prior Art as to Muller '007 (Answering Nestle Br., pp. 33, 63-67)

49. The Ganiaris '522 patent discloses only freeze concentration of

coffee extract and simply mentions the application of the technique for preparing instant coffee. It should be understood that instant coffee could mean any one of several coffee products such as frozen concentrate, low temperature spray-dried coffee, high temperature spray-dried coffee, freeze dried coffee, agglomerated coffee or any mixture of two or more of the above coffee products. The Muller '007 patent discloses a specific freeze dried coffee product which is produced by a specific freeze concentration freeze drying process, not any freeze concentration freeze drying process.

Vogt 1,783,864 ('864), Vogt 1,847,149 ('149) and Miller 2,023,607 ('607) are Not Prior Art as to Muller '522 (Answering Nestle Br., p. 65)

50. The Vogt '864, Vogt '149 and Miller '607 patents disclose a device

which is used primarily as a heat exchanger in the food industry for a very limited number of crystallization processes. However the use of this device for ice crystallization from a coffee extract was not known and its application is not a matter of routine experimentation. Coffee extract must be freeze concentrated quickly and its residence time in the crystallizer should be short. Otherwise, a precipitate of coffee solids form and plugs the centrifuge screens (filter medium). On the other hand, a certain volume is required to give time for ice crystal growth. Therefore, a tank crystallizer is not suitable for these purposes while Muller's '522 invention does the job in the manner required.

51. The Muller '522 patent discloses an apparatus system for transforming a liquid coffee extract to a dried

product. None of the cited references disclose all the components and their interrelationship as claimed in '522.

The Claims of Muller '522 are Valid
(Answering Nestle Br., p. 74)

52. The apparatus claimed in Muller '522 can be used for a variety of processes other than the one described in '007. The apparatus also can be used to concentrate and subsequently dry very dilute coffee or tea extract (less than 10% dissolved solids). The apparatus can be used to concentrate a coffee extract (from 5% to 50% dissolved solids) and subsequently dry the concentrated extract to a final product with less than 1% moisture. This apparatus is not limited to the critical operating (10% - 30% to 30% - 50%) conditions of the '007 process or product (1-5% moisture), or to maintaining the frozen mass temperature

in the range of 0°C to -45°C during the freeze drying cycle.

The Claims of Muller '007 and '522 are Valid Under 35 U.S.C. § 112 -- First Paragraph (Answering Nestle Br., pp. 75-78)

53. The '007 specification discloses clearly that the concentrated extract is frozen to -40°C (within the claimed range of 0°C to -45°C; col. 4, line 64) and the ice is sublimed. A person skilled in the art knows that in order to remove all the frozen water by sublimation, the frozen mass of extract must remain frozen during the entire process cycle. Thus, Muller '007 has specified a temperature range (0°C. to -45°C.) in his claims as filed which shows that the coffee extract must be kept frozen within that temperature range during freeze drying. The coffee solids are generally subjected to pressures in the range of about 200 to

250 microns during freeze drying.

54. If the concentrated coffee extract is frozen in a tray, the top surface will be dried first while at the bottom the extract will be frozen. Thus, the top surface could easily be overheated to over 100°F. and, in turn, cause the evaporation of volatile aromatic compounds and deterioration of the flavor.

55. Furthermore, Example 1 clearly states the time required for achieving a dried product with 1-5% moisture. The moisture content of the final product is a very critical specification. A moisture content of less than 1% results in the loss of volatile aromatic components due to over drying; it takes considerable time and heating to reduce the moisture to less than 1%. On the other hand, if the moisture content is over 5%, the storage stability of the

product is limited. For a commercial product, which might be stored for several months, it is critical that its quality not deteriorate.

56. With reference to the Muller '522 patent, Example 1 clearly outlines a process to be used with the '522 apparatus. The process disclosed in this example is similar to the '007 process. However, as shown above, the apparatus can be used with other processes.

The Claims of Muller '007 and '522 are Valid Under 35 U.S.C. § 112 - Second Paragraph (Answering Nestle Br., pp. 78-79)

57. The claim language is clear for the same reasons outlined above. A person skilled in the art of the manufacture of soluble coffee products could easily produce coffee by following the procedure dictated by the claims of

'007 or by using the apparatus dictated by the claims of '522.

The Features of the Muller '007 and '522 Claims Were Not Offered For Sale More Than One Year Prior to Their Effective Filing Date (Answering Nestle Br., pp. 42-50, 85-88)

58. The applications for the '007 and '522 patents were filed or effectively filed on January 28, 1966. Accordingly, any sales which would be a statutory bar to their validity would have to have taken place prior to January 28, 1965.

59. The only sale by Struthers to General Foods prior to January 28, 1965 was pursuant to an agreement dated August 12, 1964. That agreement did not provide for any freeze drying apparatus, process technology or know-how. Struthers, for example, did not sell

> "subjecting said more concentrated extract to relatively complete dehydration by freezing the extract

> to a solid mass and freeze drying to a moisture content of about 1 to 5 percent at temperatures between about 0° to -45° C.

as set forth in claims 1(d)* of the '007 patent, nor did Struthers sell the combination of claim 1(d) with the remaining steps of that claim.

60. Nor, for example, did Struthers sell either

> "freezing means for freezing the extract;" or
>
> "means for removing moisture under vacuum from frozen extract by sublimation;"or
>
> "heat source means coacting with vacuum means for heating and drying the frozen extact."

as set forth as subparts (d), (e) and (f) in the '522 patent. The combination of claims 1(d), (e) and (f) with the

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* The original patent statement as to a temperature of -50°C. was subsequently amended to -45°C.

remaining elements of that claim was likewise not sold to General Foods.

s/Neophytos Ganiaris
NEOPHYTOS GANIARIS

Sworn to before me this
11th day of May, 1981

s/Adam B. Gilbert
Notary Public

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF NEW JERSEY

STRUTHERS PATENT CORPORATION,	
Plaintiff,	Civil Action No. 663-72.
v.	
THE NESTLE COMPANY, INC.,	AFFIDAVIT IN OPPOSITION TO NESTLE'S MOTION
Defendant,	FOR PARTIAL SUMMARY JUDGMENT
v.	(GROUP II)
STRUTHERS WELLS CORPORATION, and STRUTHERS SCIENTIFIC AND INTERNATIONAL COPORATION,	
Additional Defendants on Counter-claim.	

STATE OF NEW YORK)
) ss.:
COUNTY OF NEW YORK)

NEOPHYTOS GANIARIS, being duly sworn, deposes and says:

1. I reaffirm and include herein by reference all statements made in my Group I affidavit. I make this affidavit in opposition to Nestle's motion for partial summary judgment of invalidity and/or unenforceability of Ganiaris patents 3,531,295 (the "295 patent") and 3,620,034 (the "034 patent"), also known as Nestle's "Group II motion."

Introduction to Recovery of Coffee Solids

2. After centrifugation to separate the ice crystals from the concentrated coffee extract, the exterior surfaces of the ice crystals in the centrifuge are coated with coffee extract. Coffee

solids are not occluded in these ice crystals and can therefore be washed and further centrifuged to remove the extract from the surfaces of the ice crystals, with coffee solids being recovered from the wash solution. This can be accomplished by returning melted ice crystals and coffee extract adhered thereto to the coffee extractor or by removing coffee directly from the melted ice. Recovery of the additional ice surface coffee extract is very important economically because coffee is very expensive and use of Struthers' system can increase extracted coffee solids by about 5%. The foregoing background is necessary to my discussion of prior art,

infra. Before turning to prior art, I will address certain of Nestle's initial arguments.

Ganiaris '295 and '034 Are Not Invalid by Reason of Struthers' Offer for Sale (Answering Nestle Group II Mem. [hereinafter Nestle Br.] pp. 20, 63-64)

3. The subject matter of the '295 and '034 patents were not sold to General Foods Corporation ("General Foods") more than one year before the filing of the applications for '295 and '034 or before my invention thereof. The sales contract between Struthers and General Foods dated August 12, 1964 does not mention that the loss of coffee solids is related to coffee solids in the ice or that the ice

should be recycled to recover solids or that any attempt should be made to recover the coffee solids from the melted ice. Indeed, the equipment and system as supplied to General Foods in 1964 had no provisions for the recovery of coffee solids from melted ice. Melted ice was considered waste.

4. The answers to General Foods' interrogatories (noted in Nestle Br., p. 45-48) in the Delaware litigation do not indicate that recovery of coffee solids from the melted ice was incorporated in the FreCon system sold to General Foods in 1964. Struthers only disclosed to General foods that recovery of coffee solids, and recycling of melted ice to

extractors, evaporators, spray-dryer, is possible.

Ganiaris '295 Is Not Invalid
Under 35 U.S.C. 102(f)
(Answering Nestle Br., pp. 34-38)

5. Nestle claims that I am not the inventor of the '295 invention. Nestle is not correct. I am the inventor. I disclosed the invention to General Foods during several meeting with their engineers sometime in 1965.

6. The "confidential" memorandum (relied on by Nestle [Br., pp. 5-6]) does not say that General Foods gave the idea to me. It simply states that General Foods intended to implement the concept. General Foods decided to adopt the

Ganiaris invention because it wished higher yield immediately. The idea was mine and not derived from General Foods.

Ganiaris '295 Is Not Invalid Over the Prior Art (Answering Nestle Br., pp. 39, et seq.)

7. Sivetz (Nestle Tab R) does not show steps (a), (b) and (c) of claims 1 and 3 of the '295 patent. He simply mentioned the operations involved without showing the interelationship required for the process to function. For example, on page 15 of the Sivetz reference, he shows a phase diagram which clearly indicates that the ice-phase has large quantities of occluded coffee solids. If this phase diagram were correct, centrifuging and

washing would not purify the ice beyond the limits set by the equilibrium lines. Struthers' research has proven that pure discrete ice crystals can be grown in coffee solutions without any occlusion. There is no prior art (patents, publications or anything else) which shows what Struthers discovered and disclosed in patents with respect to this phenomenon.

8. Again, on page 16, Sivetz shows a flow diagram of a freeze concentration process for concentrating coffee extract from 25% solids and removing the ice phase with 1% solids in the ice phase. However, this diagram does not show centrifugation (or indeed any other ice

separation technique).

9. On pages 16-19, Sivetz makes several unrelated general statements which have no meaning in relation to the '295 patent. Sivetz states that "sharp separation of ice and more concentrated coffee is obtained with large ice crystals which entrain little extract in centrifuge separations" (Tab R, p. 16) and that "large ice crystals make for efficient separation of ice from the concentrated coffee solution" (Id., p. 17). On the other hand, Sivetz makes the following statements:

a. There is hardly any literature on the growth of ice crystals in suspension (Id., p. 17).

b. The ice crystals also occlude extract (Id., p. 17).

To the extent that the ice crystals occlude coffee solids, the efficiency of separation of coffee extract from ice is limited. The '295 patent, however, clearly discloses that discrete ice crystals can be grown in extract comprising more than 20% coffee solids and these ice crystals can be purified to less than 5% coffee solids.

10. The Bassett 529,202 ('202) patent (referred to by Nestle [Br., pp. 39-40]) discloses a process involving

a. freezing the extract in a mold and separating concentrated extract by reversing the mold; and

b. crushing the ice and subjecting it to centrifugation.

It is clear that in this process there is no intention to form discrete ice crystals in suspension of the extract solution, whereas the '295 process forms discrete ice crystals and there is no need for crushing the ice prior to centrifugation. In addition, the infused solution is diluted considerably lower than the limits (15% - 30%) set in '295 for the feed extract.

11. Nor does Bassett show that the crushed ice solid mass can be purified to less than 5% coffee solids. If Sivetz' phase diagram were correct, and this was the industry opinion at the time, one

would expect the ice solid mass to have occlusion of 15% which can not be reduced by washing in a centrifuge.

12. The melted ice in Bassett '202 is a weak solution. There is no data in the prior art to indicate that a weak solution has less than 5% coffee solids. As a matter of fact, Sivetz, who provided the only phase diagram available, indicates that if Bassett freezes his infusion to -10°C, the ice phase will have an occlusion of at least 15% coffee solids. The limit of 5% can be achieved only if the ice crystals are formed as pure discrete ice crystals (substantially no occlusions) in accordance with steps (a) (b) and (c) of the '295 patent.

13. Lund 3,205,078 ('078) (next referred to by Nestle [Br., p. 42]) refers to orange juice.* Phase diagrams relating to orange juice and other fruit juices were clearly known and indicated that pure discrete ice crystals (no occlusions) could be formed (Nestle Group I Exhibits, Tab T, p. 602). But such a phase diagram or freezing curve did not exist for coffee in the prior art. Sivetz' diagram is the only one available, and as stated above not only did it not make the disclosures of the '295 patent, but his treatise stated that coffee would be occluded in the crystals (see ¶¶ 7-9, supra).

15. Sperti 2,588,337, Walker 3,156,571, Cole 2,967,778 and Bedford

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* As stated in my affidavit for Group I, results from orange juice cannot be extrapolated to coffee. The recycling of melted ice in Lund only applies to orange juice.

2,354,633 (referred to by Nestle [Br., p. 42]) refer only to fruit juices and are not applicable for the reasons previously set forth in respect to orange juice. (See my Group I affidavit at ¶¶ 21-24).

16. Bilenker 2,949,364 (referred to by Nestle [Br., p. 42] refers to cold extraction. The percentage of coffee solids in the ice is not important because there is no melting and subsequent heating to high temperatures (250°F), Bilenker, therefore, is not a pertinent reference.

17. Svanoe 3,347,058, Svanoe 3,295,021, Pike 3,285,022, and Ganiaris 3,283,522 ('522) (Nestle Br., pp. 42-43) do not disclose recycling melted ice to the extractor.

18. In short, none of the prior art references cited by Nestle and discussed in ¶¶ 7-17 above disclose the complete combination of steps as claimed in '295.

The '295 Patent is not Invalid
Under 35 U.S.C. § 102(d)
(Answering Nestle Br., pp. 48-51)

19. The Struthers' French patent 1,419,922 ('922), which relies upon priority of Ganiaris '522, discloses a process for freeze concentrating coffee extract. The system can be defined by three streams:

a. Feed (dilute extract);

b. Product (concentrated extract); and

c. Ice (effluent from the plant)

20. Regardless of how the system is operated, there is one stream (feed) entering the plant, another stream (product) leaving the plant and an ice stream leaving the plant. The ice stream leaving the plant cannot be recycled back to the plant for the recovery of coffee solids. Any attempt to recycle this ice stream will defeat the purpose of concentration. The '295 patent, on the

other hand, discloses a process which teaches the recycling of melted ice (the effluent stream from a freeze concentration plant) either to the extraction process or to some other process for recovering the coffee solids. In short, the Struthers' French '922 patent refers to internal recycling (within the freeze concentration system), whereas the '295 patent refers to external recycling (outside the freeze concentration system).

21. The foregoing differences between the '922 and '295 patents are critical. In the case of the internal recycling, the quantity of coffee solids in the effluent ice stream could be 10-15% without any effect on flavor because all streams are maintained at low temperatures. On the other hand, the external recycling concept of '295 contemplates heating at high temperatures

(extractor or spray drier, etc.) and the coffee solids in the ice must be below 5% in order to avoid flavor and aroma deterioration.

Ganiaris '034 is Not Invalid Over Prior Art
(Answering Nestle Br., pp. 51, et. seq.)

22. The Ganiaris 3,620,034 patent (the "'034" patent) discloses a process with at least two crystallization stages. In addition, the weight percentage of ice crystals in the crystallizer is limited to the range of 20-30%. In every crystallizer, the following processes occur simultaneously:

a. Nucleation; and

b. Crystal Growth

The rate of nucleation should be in balance with the rate of growth; otherwise, excessive nucleation will result in a slurry of very small crystals. In the case of coffee extract,

it was found that in order to minimize the nucleation rate, it is necessary to provide a sufficiently large ice crystal surface area in the crystallization zone (20-30% by weight of ice crystals). With the foregoing in mind, I turn to Nestle's specific references.

23. The Ganiaris '295 patent (cited by Nestle [Br., pp. 58-60]) discloses a process without any limitation to the number of the crystallization stages. The weight percentage of ice crystals of '295 in the crystallization zone could be 10-15% or even 35-40%, etc.

24. The Ganiaris '522 patent (cited by Nestle [Br., p. 61])does not disclose the requirement for maintaining 20-30% ice crystals by weight in the crystallization zone.

25. Tne Kellogg 2,408,260 patent (cited by Nestle [Br., p. 61]) discloses a process for freezing the extract and

then crushing the solid ice mass prior to centrifuging, whereas the '034 patent discloses the formation and growth of discrete ice crystals in suspension which can be separated from the concentrated extract without any other treatment (crushing, etc.) prior to centrifugation.

26. The Berger 2,896,418 patent (Nestle Br., p. 61) does not disclose a process for forming discrete ice crystals with a 20-30% ice crystal content in the crystallization zone and with at least two stages for crystallization. It is not comparable to the '034 process.

27. Lund 3,205,078 patent (Nestle Br., p. 61) discloses a process for freeze concentrating fruit juices. Coffee is mentioned as a possible application without giving any processing details. Extraction of pulp (orange juice) does not involve the high

temperatures required for the coffee extraction process.

28. Svanoe 3,285,021 patent (Nestle Br., p. 61) discloses a process where the crystallization tubes are connected in parallel, whereas, the '034 patent discloses a process wherein the crystallizer passes are serially connected. This distinction is critical, for it avoids the necessity to distribute the flow of the feed to the crystallizer and prevents freeze ups in the tubes.

29. Pike 3,285,022 patent (Nestle Br., p. 61) discloses a process for vegetable and fruit extracts. Coffee extract is not mentioned in the specification or the claims. Indeed, the concentrations of the various streams are all with reference to fruit juices. That Pike mentions one of the operating conditions of the '034 process (25% ice crystals) is not a disclosure of the

entire process or even the single step for coffee.

30. Svanoe 3,347,058 patent (Nestle Br., p. 61) discloses only one operating condition of the '034 patent, whereas the '034 process involves several steps. Moreover, Svanoe separates the freezing zone from the crystal growth zone, such that his operating conditions cannot be applicable to '034.

31. Cole 2,967,778 patent (Nestle Br., p. 61) discloses a process for orange juice and, as was shown in my Group I affidavit, the processing conditions and the order of performng each step are not applicable to coffee.

The '295 Patent is Not Invalid Under 35 U.S.C. § 112

32. Nestle's Br. p. 27 indicates that the '295 specifications states a process for recycling the melted ice to

the extraction step. Furthermore, on p. 28, it is stated that there is no hint in the specification of doing anything else with the melted ice.

33. However, it appears from the description of the process in the specification that the only reason for recycling the melted ice to the extraction is to recover coffee solids from said melted ice (Id. 3, p. 36 to 44). There is no other reason to recylce the melted ice to the extraction. If someone could invent an efficient and economical process to remove the ice crystals from the system without any adhering coffee solids (zero), there will be no reason to recycle the melted ice to the extraction step.

34. The specification, therefore, discloses a proces for recovering coffee solids from the melted ice. Recycling the melted ice to the extraction is only

one possible application. The spirit of the invention is to recover the solids from the melted ice which has been generated as a result of the processing steps (a) through (e).

The '034 Patent is Not Invalid Under 35 U.S.C. § 112

35. The two specifications are exactly the same. The specification of '034 discloses all the process conditions of the British Provisional Application; including the flow diagram shown in the drawing.

36. There is no question that the specification of '034 and of the British provisional application are the same (see Nestle's Br. p. 57). Therefore, the question is whether or not the Claim 1 of '034 is described in the specification.

37. According to Claim 1, a concentrate of coffee is prepared from a

liquid containing about 24% coffee solid by

step (a) partially freezing aqueous coffee extract in at least two serially connected crystallizer passes to form a mixture of about 20-30% by weight ice and a concentrated extract.

38. Therefore, the first step of the process is to form a mixture of about 20-30% by weight ice crystals and concentrated extracted by partial freezing of a feed solution with about 24% coffee solids.

39. The '034 patent and the British specifications clearly indicate that concentrated extract from crystallizer 14 has a concentration of 26% to 30% coffee solids. By material balance, one can easily show that if the feed solution has 24% coffee solids and the concentraction

solution 30% coffee solids the efficient mixture from the crystallizer is 20% by weight ice crystals.

40. The recycle of mother liquor (concentrated extract) via pipe line 38 is required only for control purposes to adjust the percentage of ice crystals in the efficient mixture from the crystallizer to 20-30% by weight. If the feed solution is 24% coffee solids, the recycle stream (pipe line 38) is zero. Therefore, no enrichment of the feed to the crystallizer is necessary. In Ex. 7, p. 0024, the British Prov. Appl. clearly states that circulation of mother liquor (pipe line 38) should be balanced and controlled so that the percentage of ice crystals by weight in solution in cyrstallizer 14 is between 20-30%.

41. Nestle's Br. pp. 55, attempts to imply that the British application requires enrichment of the dilute feed.

(13% to 24%) prior to feeding it into crystallizer 14. However, the British application states very clearly also that the slurry effluent from the crystallizer 14 should be 20%-30% by weight ice crystals. A person skilled in the art can easily calculate that if the dilute feed is 24% coffee solids, there is no need for enrichment (mother liquor recycle via pipe line 38 is zero).

42. Nestle's Br., p. 56, states that Claim 1 of '304 patent makes no provision for enrichment of the liquid which contains 24% solids prior to freeze concentration. As it was explained above, there is no need for such a provision, No enricment is required if one must maintain a 20-30% ice slurry.

43. In summary, the Claim 1 of '034 is fully disclosed in the specification of '034 and of the British application. Therefore, Claim 1 of '034 can have the

benefit of the British application filing date (July 15, 1966).

s/NEOPHYTOS GANIARIS
NEOPHYTOS GANIARIS

Sworn to and
Subscribed before
me this 11th day
of May, 1981

s/Adam B. Gilbert
Notary Public

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF NEW JERSEY

STRUTHERS PATENT CORPORATION,	
Plaintiff,	Civil Action No. 663-72.
v.	
THE NESTLE COMPANY, INC.,	AFFIDAVIT IN OPPOSITION TO NESTLE'S MOTION
Defendant,	FOR PARTIAL SUMMARY JUDGMENT
v.	(GROUP III)
STRUTHERS WELLS CORPORATION, and STRUTHERS SCIENTIFIC AND INTERNATIONAL COPORATION,	
Additional Defendants on Counter-claim.	

STATE OF NEW YORK)
) ss.:
COUNTY OF NEW YORK)

NEOPHYTOS GANIARIS, being duly sworn, deposes and says:

1. I reaffirm and include herein by reference all statements made in my Group

I and Group II affidavits. I make this affidavit in opposition to Nestle's motion for partial sum mary judgment of invalidity and for unenforceability as to the Reimus et al. patents Nos. 3,381,302, 3,449,129, 3,632,353 and 3,474,723 (the "Group III motion").

Introduction to Dewaxing

2. In the manufacturing of instant coffee, the qual ity (flavor and aroma) of the final product depends mainly on two factors:

a. Quality of the coffee beans; and

b. Processing techniques.

3. The first steps in processing are blending the coffee beans, roasting the beans, and extraction of coffee solids from the beans (in the extractor). These processing procedures are dependent upon the experience and

judgment of the operators. Manufacturing a good quality instant coffee is an art.

4. The quality of the coffee extract leaving a commercial extractor will vary from one plant to another, and will even vary within the same plant from one batch to the next. All such coffee extract contains "waxy" types of material which vary in quantity and chemical composition depending upon the processing techniques for preparation of the coffee extract and the type of coffee beans in the blend. The "waxy" types of material are polymeric substances produced primarily by hydrolysis at 250 degrees to 350 degrees F. during extraction from the beans. The exact chemical composition of the "waxy" substances is very complex and cannot be defined in any precise manner because it varies substantially depending on the variety of beans. But it has been clear for some time that "waxy" types of

material degraded the taste of the coffee by removing certain natural oils therefrom, gummed up the centrifuge used in separating ice from the coffee extract and caused specks on the coffee cup. Thus, it is very advantageous to prepare the extract in a way which removes precipitates of the waxy materials.

5. In general, a coffee extract prepared at high temperatures (250 degrees to 350 degrees F.) will have these "waxy" materials (approximately 5%), whereas an extract prepared only with hot water (up to boiling)* will have

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* A coffee solids concentration of less than 10% of the weight of the beans is normally obtained at this range. Commercial extraction must take place at higher ranges to derive higher solids content to obtain the maximum feasible amount of product. Coffee solids concentration of 35% of the weight of the extract can be and are obtained.

a very low content of some different types of of wax-like material. High temperatures (resulting in hydrolysis) are used in commercial extraction in order to extract more solubles from the coffee beans.**

6. Therefore, a coffee extract produced with boiling or lower temperature water (as described by many patents in the prior art relating to preparation of an infusion) is of a higher uality than the coffee extract produced in a commercial extractor at higher temperatures, which is the type of extractor referred to in the Group III Reimus patents. The Reimus patents disclose a technique which results in a

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** Basically, in extraction, certain substances (cellulose and others) which are insoluble in water are converted chemically (by hydrolysis) at high temperatures to water soluble substances.

product which, though it has been subjected to high temperature extractors, has a quality approaching that of extract only subject to low temperature extractors.

7. In every manufacturing plant, the objective is to achieve the highest quantity of solubles from a pound of coffee beans (thereby reducing the unit cost of raw material) without any degradation of the taste and flavor of the final product.

8. To meet this objective at the time the applications for the Reimus patents listed in the Nestle Group III memorandum were filed, it was necessary to clarify (by centrifugation) the hot extract leaving the extractors in order to remove a "sufficient" quantity of the "waxy" substances to minimize "specks" and "rings" on the coffee cup so that the coffee would have a "clean" appearance.

Thus, the two key tests performed after extraction were empirical.

a. Taste tests by panels of individuals; and

b. Clean cup tests, so that there are no specks or rings in the cup.

There was nothing scientific about these tests. As long as a sufficient" quantity of "waxy" materials was removed to meet the taste and clean cup tests, the extract was satisfactory.

9. While Struthers' new system solved the problems caused by the old techniques (see ¶¶ 5-6 above), resulting in an extract with much less of the old type of "waxy" substance and an extract from which a coffee with improved taste ultimately emerges, several new problems (not experienced in the prior art) with respect to the "waxy" materials had to be solved.

a. By lowering the temperature of the extract below 80 degrees F., a precipitate was formed, even from extract that had already been clarified at high temperatures. The precipitate was deposited on the centrifuge of the "FreCon process" (thereby "gumming it up") preventing the efficient separation of ice crystals from concentrated extract.

b. This precipitate would also cause formation of unwanted specks and rings in the coffee cup after brewing instant coffee; and

c. Removal of the precipitate by any means was not desirable because it resulted in a loss of coffee product.

10. The Reimus inventions

offered solutions to these problems. First, Reimus recognized differences between the "waxy" materials that were removed at high temperatures (over 100 degrees F.) and the precipitate that was formed at low temperatures (80 degrees to 32 degrees F.). Reimus found that

a. The low temperature precipitate was a mixture of "waxy" materials (with no effect on taste) and coffee components which were needed for making a good quality (flavor and aroma) product; and

b. The ratio of the "waxy" materials to the "desirable" coffee components in the precipitate depended on the cooling technique of the extract.

11. After having recognized these differences, Reimus offered specific solutions as seen in his patents. The

Reimus inventions have been used in industrial applications for manufacturing millions of pounds of coffee. Furthermore, his inventions were not obvious, even to people closely involved with the freeze concentration and freeze drying technology related to coffee at the time the inventions were made. Reimus' discovery that the precipitate was a mixture of "waxy" materials and "desirable" coffee solids and his method of wax removal were true contribution to the art.

There is No Double Patenting of a Single Invention (Answering Nestle Group III Mem. [hereafter Nestle Br.] pp. 55-60)

12. The '302 patent teaches that cooling of the extract to 32 degrees to 45 degrees F. and holding it for a proper time will remove substantially all the waxy materials while retaining the coffee

solids that enhance the flavor of the product.

13. Reimus '129 discloses the removal of the "waxy" materials should be done at 45 degrees to 80 degrees F. if the holding period is longer than that contemplated by the '302 patent. Reimus was the first to recognize that the flavor desirable coffee solids do not precipitate in appreciable quantities within that temperature range. The precipitate in that range is primarily "waxy" materials which can be removed with substantially no adverse effect on product quality.

14. The '129 invention is very desirable whenever the operator is forced to hold the extract for prolonged periods due to equipment breakdown or other inefficiencies in the plant. In practice, the '302 process must be used in order to avoid plugging the

centrifuge, preventing the removal of desirable coffee solids and causing system shut-down to clean the "waxy" material from the centrifuge. However, whenever the feed coffee extract must be kept for prolonged periods of time (beyond the control of the operator), the '129 process is used.

15. Under normal operation, the extract is cooled to 32-45 degrees F. for a specific period (about 1 hour). If the operator is forced to keep the extract for 4-8 hours due to equipment breakdown, it is necessary to practice the '129 process for 3-7 hours and use the '302 process for only one nour. Thus, the desirable coffee solids which affect flavor are prevented from precipitating.

16. The '129 patent, therefore, discloses a different process from that taught by '302 because '129 teaches the precipitation and removal of "waxy"

materials and prevention of the removal of desirable coffee solids that might affect flavor for the reasons stated above. It also relates broadly to dehydration and not just to freeze concentration.

17. Reimus '353 is a further improvement over Reimus '129. The '353 patent discloses the temperature range of 80 degrees F to 36 degrees F for a 24% extract. If a 24% extract is held for many hours at 32-45 degrees F ('302 patent) the flavor will deteriorate due to excessive precipitation of desirable coffee solids. If a 24% extract is not cooled below 45 degrees F ('129 patent), the "waxy" materials cannot be removed completely in order to avoid plugging of the centrifuge. Furthermore, the '353 patent teaches that a 24% extract can be cooled to 36 degrees F. and avoid both

problems (flavor deterioration and centrifuge plugging).

18. The '723 patent refers to an apparatus which can be used with products other than coffee extract (for example, tea). It is not limited to the temperatures or concentrations disclosed in '302, '129 or '353. In addition, (1) the pre-cooling and holding means and separation means are accomplished in separate devices, whereas the '302, '129 and '353 do not require cooling and holding in separate devices; (2) the crystallizer is specified to be a tubular one, whereas ice crystallization can be accomplished in other types of crystallizers; (3) the '302, '129 and '353 processes can be carried out by different cooling means (heat exchanger), holding means (a tank) and separation devices (filter or centrifuge). In short, the '302, '129 and '353 processes

can be carried out in an apparatus such as in '723, but these processes can also be carried out in a large variety of other devices.

The Reimus Patents Are Not Vague or Indefinite to One Skilled in the Art (Answering Nestle Br. pp. 67-73)

19. In practice, the teaching of the '302 patent is clear, and the terms "sufficient" and "substantially" are not vague. One skilled in the art knows that the type and quantity of "waxy" materials in the extract will vary, depending on the blend of coffee beans and the processing techniques used during roasting and extraction; any precise numerical definition of the quantity is neither important nor meaningful. The important point is that the Reimus patents teach how coffee extract can be clarified sufficiently (with minimum removal of coffee solids) to avoid specks

and rings on the coffee cup and plugging of the centrifuge without adverse effect on flavor.

20. Nestle argues that the Reimus '302 and '129 patents failed to be sufficiently specific because time for holding is not specified (Nestle Br., pp. 67-69). However, the quantity of precipitate formed is a function of time and temperature. In practice, the operator of the coffee manufacturing plant has no absolute control over time because the batches come in different size and are processed at irregular intervals. It is obvious that the first gallon of a 500-gallon batch can be processed immediately whereas the last gallon might be held for several hours prior to processing because, among other things, of the size of the equipment and the time it takes to cool the extract. (There is no such thing as

"instantaneous" cooling.) In addition, breakdown of equipment and other plant inefficiencies often force the operator to hold coffee extract in a storage tank for several hours. There is almost always a "holding" time beyond the operator's control.

21. On the other hand, the operator has absolute control over temperature. This operating condition is clearly specified by the '302 patent. In practicing the invention, the operator establishes a minimum level of precipitate that must be removed from each type of extract and the holding time required by performing a few routine tests and thus avoids flavor deterioration, centrifuge plugging, specks and rings.

22. The '129 patent teaches the cooling of the extract to 80 degrees F. to 45 degrees F., holding it in that

range of temperature and removing the precipitate without any adverse effect on flavor. In other words, the precipitate formed in this temperature range is primarily the "waxy" type of material but not the flavor-related oils. In practice, this invention is a great assistance to the operator. It tells him that if, for reasons beyond his control, he must keep the extract for longer periods of time than required at 32 - 45 degrees F., it is best to keep the temperature at 80 degrees F. to 45 degrees F. In this way, he would avoid the heavy precipitation of desirable coffee solids which have an enormously detrimental effect on flavor.

23. The '353 patent teaches the specific temperature range (80 degrees F. to 36 degrees F.) for cooling and holding a 24% extract. It is another invention from the '129 patent. By cooling 24%

extract to temperatures as low as 36 degrees F., the precipitate is primarily a "waxy" type material that can be removed without any substantial adverse effect on flavor.

24. The Reimus patents clearly disclose how to produce high quality coffee (even though elevated temperatures [250° F. to 350° F.] have been used) while producing the highly concentrated (10%-30%) coffee solids necessary for a commercial operation.

25. Both the '302 patent and the '129 patent clearly state temperature ranges: 32 degrees to 45 degrees F. and 45 degrees to 80 degrees F., respectively. The allegation that Reimus does not specifically claim 40 degrees F. (Nestle Br. p. 65) as an important temperature is incorrect. The 40 degrees F. is within the claimed '302 range and discussed at column 3, line 28.

26. In short, the Reimus patents do not give a number for holding time, because as explained above:

a. The holding periods vary with different coffee extracts; and processing techniques vary;

b. The "holding period" cannot always be controlled by the operator; and

c. The holding period can vary because of quality requirements. It is common practice in the industry to control every step of the coffee manufacturing process by "empirical" (meaning usually panel taste) tests, whereby one can establish the quantity of precipitate that affects taste for a specific extract.

In short, Reimus' teaching of the cooling temperature range is a meaningful guide to one skilled in the art to solve the problems. Duration was specified in

qualitative terms because the holding time varies with factors such as the chemical composition of the blend and the process used.

The Reimus Patents Are Valid Over Prior Art

27. Zorn 1,507,410 (cited by Nestle Br., pp. 8-12, 73-4) discloses a process for eliminating the undesirable elements which, upon standing, cause the chemical or other changes which break down the flavor of coffee concentrate. Reimus '302, on the other hand, discloses a process for eliminating the "waxy" materials to avoid the plugging of the centrifuge and preventing the removal of "desirable" coffee components.

28. The key question is whether the "undesirable" elements of Zorn are the same as those of Reimus. Obviously, neither patent discloses the composition

of these materials, because it is impossible to do so when dealing with a natural product reduced to extract by various techniques. However, from the specification of these patents, it is clear Reimus refers to an extract which has been produced by an entirely different processing technique from the infusion of Zorn. The Reimus extract has been produced at high temperatures (250 degrees F. to 350 degrees F.) and chemical reactions have caused the generation of polymeric substances which Reimus defines as tars or "waxy" materials. Reimus' concentrations of 10-40% dissolved coffee solids clearly indicate production of extract by hydrolysis (chemical reaction) which takes place only at high temperatures.

29. By contrast, Zorn's extract is an infusion produced with water which is hot but below the boiling point of

water. It is known that at such a temperature hydrolysis cannot proceed and, thus, the tars and "waxy" materials can not be produced.

30. The Zorn "undesirables" are therefore entirely different from the Reimus "waxy" type materials. The processes can not be compared because the materials to be eliminated and the reasons for removing them are entirely different. Indeed, Zorn discloses a process which, if applied to the coffee extract of Reimus, will cause precipitation and removal of most of the desirable coffee solids.

31. Zorn 1,636,890 patent (cited at Nestle Br., p. 28) discloses a process for eliminating the "undesirable" elements from fruit juices. This process is completely foreign to the coffee extract treated by the Reimus patent for

reasons stated in my Group I affidavit (¶¶ 21-24).

32. Rolle 2,234,063 (cited at Nestle Br., 8-9, 74) discloses the treatment of other substances, but doesn't mention coffee extract. Furthermore, there is no reference in the application (page 4, lines 11-15) to the quality of the product. Reimus '302 teaches the cooling to 32-45 degrees F., the removal of the "waxy" materials and the prevention of removing coffee solids which will affect the quality of the product, all of which Rolle does not disclose.

33. Tarasch 2,804,389 (cited at Nestle Br., pp. 7, 74) discloses a process for hardening a fat wax (by adding chemicals) within the coffee bean. This substance has no relation to the Reimus "waxy" type materials produced by hydrolysis of the coffee beans at high

temperature (250-350 degrees F.) during the extraction process.

34. Frederickson 2,410,157 (cited at Nestle Br., p. 9) discloses a process for removing deleterious waxes but he shows no high temperature extract. Reimus '302 describes a process for removing the high temperature "waxy" type materials and preventing the removal of desirable coffee solids that affect flavor. In addition, Frederickson '157 does not disclose the concentrations of the extract or that he proceeds to dehydrate or freeze concentrate the extract.

35. The Sivetz book (vol. 2, p. 15) (cited at Nestle Br., p. 10) discloses, and Struthers freezing-point curve (Item 2) indicates, that a 10% coffee extract freezes at 31.2 degrees F. The freezing point curve, however, is different for each extract. Indeed, even a 10% extract can have a freezing point as low as 30.5

degrees F. The coffee bean blends and the processing techniques definitely influence the freezing point of the extract. Thus, 32 degrees to 45 degrees F. as disclosed in '302 is not near the freezing point.

36. Furthermore, Sivetz states on page 16 of his text that the freeze concentration process has the advantage of coagulating the tarry coffee substances between the ice crystals and that the resulting extract has a markedly reduced hydrolysis flavor and taste. This statement clearly indicates that the "waxy" materials are a result of hydrolysis. Further, Sivetz expects the tarry materials to be removed with the ice. Sivetz did not disclose the plugging of the centrifuge screens or other filter medium and he did not recognize the precipitation of valuable solids which should be avoided.

Moreover, Sivetz does not teach the expedient of settling to remove "tars" prior to freeze concentration.

37. Cottle 3,362,178 (cited at Nestle Br., p. 77) does not disclose a process for coffee. His description refers to other substances but not coffee. The statement on beverages is too broad to conclude that coffee is included since one cannot extrapolate from other beverages to coffee. It is only with coffee extract that the problem of co-precipitation exists ("waxy" materials plus "desirable" coffee solids). Processing conditions disclosed on beer, orange juice, etc., cannot be extrapolated to coffee extract. The Reimus patents offer a specific solution for coffee extract in dealing with the co-precipitation problem.

38. The Svanoe Patent 3,285,021, the corresponding Canadian Patent 699,247 and

the McKay 3,216,833 (cited at Nestle Br., p. 22) are only for freeze concentration. None of these patents anticipates the formation of a precipitate that is a mixture of "waxy" materials and "desirable" coffee solids at the temperature ranges involved.

39. Ganiaris 3,283,522 (cited at Nestle Br., p. 78) discloses the freeze concentration step without any anticipation of the "dewaxing" problem or any indication of the co-precipitation problem.

40. Seltzer 2,891,865 (cited at Nestle Br., pp. 74-75) discloses a process for decreaming tea extract. Neither the composition of the substances involved nor the concentrations are related to Reimus.

41. Smith 3,102,036 (cited at Nestle Br. at p. 8) discloses a process for stripping oxygen from an aqueous solution

prior to freeze concentration. This process is primarily for fruit juices, and if this process were used for coffee, the end result would be foam. Coffee extract forms a very stable foam and no gas should be purged into coffee extract. Smith '036, therefore, cannot be cited as a proper reference.

Reimus' Patents Are Not Invalid
By Reason Of Prior Use And Sale
(Answering Nestle Br., pp. 31, 62-4)

42. The sales contract dated August 12, 1964 did not incorporate any equipment relating to dewaxing.

43. In March 1965, General Foods agreed to permit the installation of such equipment in the Struthers' freeze concentration plant and share the cost with Struthers. Prior to January 1965, General Foods did not even appreciate that a dewaxing operation was necessary.

44. To the best of my knowledge, dewaxing disclosures were not offered for sale to General Foods before January or February, 1965.

s/ Neophytos Ganiaris

NEOPHYTOS GANIARIS

Sworn to before me this
11th day of May, 1981

s/ Adam B. Gilbert

Notary Public

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF NEW JERSEY

STRUTHERS PATENT CORPORATION,	
Plaintiff,	Civil Action No. 663-72.
v.	
THE NESTLE COMPANY, INC.,	AFFIDAVIT IN OPPOSITION TO NESTLE'S MOTION
Defendant,	FOR PARTIAL SUMMARY JUDGMENT
v.	(GROUP IV)
STRUTHERS WELLS CORPORATION, and STRUTHERS SCIENTIFIC AND INTERNATIONAL COPORATION,	
Additional Defendants on Counter-claim.	

STATE OF NEW YORK)
) ss.:
COUNTY OF NEW YORK)

NEOPHYTOS GANIARIS, being duly sworn, deposes and says:

1. I reaffirm and include herein by reference all statements made in my Group

I, II and III affidavits. I make this affidavit in opposition to Nestle's motion for partial summary judgment of invalidity of Howell patent 3,367,126 (the Howell '126 patent) and Ganiaris patent 3,636,722 (the Ganiaris '722 patent) referred to in Nestle's Group IV motion.

Introduction to the Howell Invention

2. At the time the Howell '126 invention was developed, the problems with the existing designs of tubular crystallizers* were as follows:

a. The agitator blades scraped the heat transfer surface, thereby

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* A tubular crystallizer is a unit where the fluid to be processed (e.g., coffee extract) flows in circular tubes.

inducing excessive nucleation and small ice crystals.

b. The agitators for very long tubular crystallizers were equipped with supports; such supports were undesirable for ice crystallization and for processing food products where avoidance of flavor deterioration is extremely critical.

3. The Howell '126 "floating" agitator was a solution to the above problems. It teaches the construction of a tubular crystallizer where the clearance between the agitator blades and the heat transfer surface can be very small, thereby achieving a high heat transfer without any scraping.

Prior Art

4. The prior art did not offer a solution to these specific problems related to ice crystallization. Ferranti

409,205 ('295), Hayes 267,425 ('425), Low 803,770 ('770) and von Post 1,256,747 ('747) (cited in Nestle Group IV memorandum [hereinafter Nestle Br.] at pp. 28-29) disclose different types of floating devices. None of these devices, however, can be applied or are even related to ice crystallizers. Thus, these devices offer no solution to the problems that one had in developing an ice crystallizer for processing coffee and other comestibles.

6. Vogt 1,783,864 ('864), Vogt 1,847,149 ('149), Miller 2,023,607 ('607) and Crighton 2,267,081 ('081) (cited in Nestle Br., p. 29) disclose hollow shafts and tubular heat exchangers. The agitator, however, does not float and the blades scrape the heat transfer surfaces. None of these devices addressed the critical problems solved by Howell.

Indefiniteness (Answering Nestle Br., pp. 22-26)

7. Nestle suggests that the Howell patent is indefinite because

a. the claims are silent as to the shaft length;

b. the claims do not define the means for exhausting spent refrigerant;

c. "substantially" is indefinite; and

d. "gas under pressure" is indefinite.

Nestle is incorrect.

8. Obviously, the length of the shaft is not important. One skilled in the art knows that he can construct a short tubular unit and easily adjust the agitator blades to avoid scraping. The length where bending will start to cause scraping problems can easily be calculated depending on the materials of

construction. Therefore, specifying a numerical value will be meaningless.

9. One skilled in the art knows that the refrigerant has to be exhausted and circulated.

10. The claim for "substantially" the same weight is not indefinite. It is obvious that the invention refers to a floating shaft. If the shaft floats, the weight of the shaft must be slightly lower or exactly the same as the weight of the displaced liquid.

11. The term "gas under pressure" is not indefinite. The numerical value is not important because it will be different for each liquid and the material of construction used for the agitator.

Prior Offer for Sale
(Answering Nestle Br., pp. 20, 51-2)

12. The Howell '126 concept of a floating shaft was incorporated in the equipment sold to General Foods Corporation under the 1965 contract. The shafts for the first stage crystallizer under the 1964 contract did not incorporate (and could not have incorporated) the Howell '126 concept. Mr. Howell was not associated with Struthers in 1964. He joined the company sometime in March or April 1965.

Introduction to the Ganiaris Invention

13. A freeze concentration system involving ice crystallization and ice crystal separation consists of a feed pump, a crystallizer, a centrifuge (separation device) and pipe lines. There may also be a feed tank prior to the feed pump and a product tank at the

end of the pipe lines. Only the crystallizer requires a holding volume and, in turn, a residence time for the coffee extract or any other fluid being processed.

14. In a freeze concentration system involving ice crystallization and ice crystal separation, variations in the process used to process coffee will have an effect on the design (including the size and configuration) of the two main pieces of equipment -- the crystallizer and centrifuge. The size of the holding tanks or pipe lines is not influenced by the process variables relating to ice crystallization or ice separation.

15. Ganiaris '722 discloses the residence time of 2.5 hours for the entire system (crystallizers, tanks, pipe lines, and the rest). To a person skilled in the art, it is obvious that the residence time has meaning only in

conjunction with the crystallizer volume and ice separation device (centrifuge).

16. The size and other features of the design of the "feed tank" or the "product tank" can be determined without any regard to the crystallization or centrifugation steps. The tanks can be very small regardless of the size of the freeze concentration system. The same holds true for the pipe lines; they can be very short or very long depending on what is necessary. As a matter of fact, the "feed tank" and the "product tank" can be completely eliminated. The product tank of the extraction process can be the "feed tank" to freeze concentration, or the feed tank to freeze-drying can be used as the "product tank" of the freeze concentration system.

17. On the other hand, the "holding volume" of the crystallizer is critical for two reasons:

a. It should be sufficiently large for ice crystallization; and

b. It should be sufficiently small to avoid precipitation of coffee solids.

18. Struthers' experimental studies established that a 2.5 hours residence time is sufficient to avoid coffee solids precipitation and to accomplish ice crystallization. Although in Ganiaris '722, the 2.5 hours refers to the entire system, it is obvious from the above that the "holding volume" of the crystallizer is the only "important" volume affecting residence time.

19. In designing a mechanical device (crystallizer) with the required "holding volume" for a 2.5 hours residence time, it was recognized that the device must provide the required "heat transfer area" for removing the heat released in the

crystallization zone by the formation and growth of the ice crystals.

20. After investigating different types of crystallizer designs, we concluded that the "tubular" crystallizer offered the best possibilities for a commercially successful freeze concentration plant. However, all "tubular" designs had one limitation: the ratio of volume to heat transfer area was fixed by the diameter of the tube.

21. Based upon geometric calculation, the tubular crystallizer had to be designed with tubes having diameters in the range of 4.8 inches to 6.72 inches in order to meet the process conditions.

22. Since the use of such tubes was uneconomical for using large scale equipment, the concept of providing an annular crystallizer volume was developed. By reducing the volume of the

tube with a hollow shaft (or inner tube), one could use tubes with larger diameters and still maintain the ratio of volume to heat transfer area within the desired range (1/7 to 1/10 ft.) to avoid precipitation of coffee solids.

Prosecution of the Ganiaris '722 Patent
(Answering Nestle Br., pp. 32-36)

23. The disclosures in the British Provisional application, the Ganiaris "A" and Ganiaris "B" applications are the same. All these applications disclose

a) the precipitation problems;

b) the 2.5 hours residence time;

c) the volume to area ratio of 1/7 to 1/10 ft.;

d) the "annular" configuration;

e) the 20% to 45% coffee solids for the extract; and

f) the advantages of the crystallizer structure described in the specification.

Therefore, regardless of how these applications were prosecuted, the specifications are the same in all three of these applications. Only the claims differ.

24. In the prosecution of the Ganiaris "A" and "B" applications, all the proposed claims were broad with respect to the volume of the crystallizer. However, the '722 claims are specifically limited to "annular" volume. As is explained below, the difference between "annular" versus "tubular" crystallizers is of great importance.

25. Also the concept of "serially connected crystallizer means" is significant. A parallel arrangement of

the tubes is not feasible for coffee extract.

26. The specification is also clear with respect to coffee precipitation and ice crystallization. For maximum crystal growth without precipitate formation, the residence time and the ratio of volume to area must be established. The specification of Ganiaris "A", "B" and the British Provisional all clearly state the residence time of 2.5 hours and the ratio of 1/7 - 1/10 ft.

27. As to the Ganiaris "A" application, Nestle suggests that the specification is not clear with respect to the numerical value of the ratio of volume to area (Nestle Br., p. 32). The fact is that a mistake was made in typing the Ganiaris "A" application which was overlooked for a period of time during the prosecution. But this is not a reason for invalidity of the Ganiaris

'722 patent. The Ganiaris '722 patent states clearly the correct numerical values of the ratio and the required dimensions as they were originally disclosed in the British Provisional application.

28. Furthermore, it is obvious from the specification that the object of the invention is to have maximum heat transfer area for a given volume. One skilled in the art would have easily recognized that the error of the ratio in the Ganiaris "A" was typographical. Thus, even the examiner understood that the object of the invention was to have maximum heat transfer area, for in his brief to the Board of Appeals, he stated that the applicant was concerned with providing a "large area of cooling surface relative to the volume of material being treated." (Ex. 13, pg. 0043)

29. Nestle also argues that the Ganiaris "A" fails to disclose "means to provide a flow rate" (Nestle Br., p. 35). Ganiaris "A" does not specifically show in the specification any means for providing a flow rate. A person skilled in the art, however, would have no difficulty understanding that the coffee extract must be fed by some kind of means into the crystallizer. The extract cannot go in and out of a tubular crystallizer and have a residence time of 2.5 hours unless there is a pump or some other device to do so.

The Claims in Ganiaris' "A" and B" applications are different (Answering Nestle Br., pp. 37-38)

30. The Ganiaris "B" application resulted in a patent (Ganiaris '722) and the claims are significant and distinct from the Ganiaris "A" application. The principal distinction is that in the

Ganiaris "A", the volume to area ratio (1/7 - 1/10 ft.) was not limited to the annular volume, nor moreover, was the crystallizer limited to plural serially connected tubes.

Prior Art

31. Vogt 1,847,149 ('149) (cited in Nestle Br., at pp. 14-15, 18) discloses a ratio 1:16 to 1:3 and dimensions are in inches, whereas Ganiaris '722 discloses the 1/7 to 1/10 ratio and the dimensions are in feet. Struthers did not urge this difference during the prosecution of Ganiaris "B" but it did and does exist. This dimensional difference takes Vogt out of the '722 range.

32. Harrington 2,306,602 ('602) (cited in Nestle Br., at p. 15) discloses the "annular" type heat exchanger with a disclosure of how to connect a plurality of tubes. Ganiaris '722 claims plural

serially connected crystallizer means which Harrington does not disclose. In addition, Harrington does not disclose the 40% flow rate.

33. Reimus 3,381,302 ('302), Kolner 2,886,587 ('587) and Jackson 3,212,283 ('283) (cited in Nestle Br., p. 15) do not disclose either serially connected "annular" crystallizer tubes or the flow rate limitation of 40%.

34. Cottle 3,362,178 ('178) (cited in Nestle Br., p. 18) is not related to Ganiaris '722. The Ganaris '722 apparatus is limited to coffee; orange juice or other products do not present the same problems as previously stated. Also Cottle is for a process, not an apparatus.

35. Svanoe 699,247 ('247) and 3,285,021 ('021) (cited in Nestle Br., at p. 48) discloses a "tubular" crystallizer where the heat transfer area to volume

ratio is fixed by the tube diameter. Ganiaris '722 discloses an "annular" type crystallizer where the ratio is not limited by the tube diameter. Any size of tube over 6.72 in. can be used and still maintain the narrow range of 1/7 to 1/10 ft. ratio. Svanoe '247 does not disclose any volume to area ratio for coffee extract. On page 8, Svanoe discloses a 50 - 500 gallon volume (preferably 200 gallons). The heat transfer area is not stated anywhere in relation to these volumes.*

36. Ganiaris '722 discloses "means to provide a flow rate of said coffee solution through the annular

---

* On page 13, Svanoe discloses a heat transfer area of 100-500 square feet for orange juice (not for coffee). Furthermore, nowhere does Svanoe disclose a preferred heat transfer area of 250 square feet.

crystallization zone . . . of greater than 40%. . . . ." This clearly indicates that a pump or any other device should be provided to feed the coffee extract at the over 40% flow rate. Svanoe '247 discloses the velocity of the fluid within the freezing zone. The velocity within the tube is not the same as the flow rate of the coffee extract feed.

37. Svanoe ('247) discloses a crystallizer having all the tubes in parallel connection, whereas Ganiaris '722 clearly states "serially connected." This difference is fundamental. In a parallel arrangement, tubes will freeze up. There is no practical way to distribute uniformly the flow of the coffee extract in each tube and maintain the same velocity of flow in each tube. It should be recognized that a slurry of coffee extract and ice crystals is a non-Newtonian fluid and its viscosity depends on the slurry velocity within the tube. Thus, once the flow velocity diminishes in one tube, the viscosity keeps increasing and, in turn, the flow

diminishes further until there is no motion within that tube and a freeze up is complete.

38. The Ganiaris '722 "serially connected" annular tubes avoid this foregoing problem because it allows the designer to use large tubes and, in turn, short overall lengths; thus, there is no need for a parallel arrangement.

39. Svanoe 3,347,058 ('058) (cited in Nestle Br., pp. 49-50) discloses 80 - 300 sq. ft. in the crystallizer and a preferred volume of 200 gallons in the freezing zone. According to his disclosure, the freezing zone includes the external heat exchanger and the crystallizer. Therefore, Nestle's calculation of a ratio of 3:1 to 11:1 is without any basis. The heat transfer area of the heat exchanger is not included in the 80-300 sq. ft.

40. Svanoe '058 disclosure of a plurality of crystallizers in series refers to "tubular" crystallizers with an external heat exchanger. As was explained, such a unit has several limitations and cannot be compared to Ganiaris '722.

41. Krause 2,241,726 ('726) (cited in Nestle Br., at p. 47) discloses a process for separating ice from concentrated liquor by pressing the extract-ice slurry. However, he does not disclose that such a process can be used after the Ganiaris '722 type of crystallizer for coffee extract or that

at least two serially connected crystallizers should be used. The Ganiaris '722 claims are limited and specific.

42. Ganiaris '722 claims a hollow shaft in part (c) and should be viewed as a part of an overall apparatus. Howell '126 (cited in Nestle Br., p. 46) or any other prior art on hollow shafts is immaterial. Ganiaris '722 claims a specific combination of certain components for a specific use; he does not claim just a hollow shaft. The combination of components is not found in Howell or the other references.

Indefiniteness
(Answering Nestle Br., pp. 32-36)

43. Nestle suggests that the '722 patent is invalid because

a) the claims do not point out

the ratio of volume to area (Nestle Br., pp. 32); and

b) the flow rate constitutes no more of a distinction than residence time (Id. at 33).

Nestle is incorrect.

44. In the specification of the '722 patent, it is clearly stated that the numerical value should be 1/7 to 1/10 ft. to avoid precipitation. The claim states that the annular volume to the area should be such that precipitation is avoided. It is obvious to one skilled in the art that the ratio set forth in the specification should be practiced to benefit from the invention.

45. The object of the invention is not only to develop an apparatus that avoids precipitation of coffee extract. Ganiaris '722 discloses an apparatus to be used for freeze concentrating coffee extract (crystallizing water and

separating the ice crystals) and to avoid precipitation. In that context, means to provide a flow rate in a total structure does not render the total structure unpatentable.

46. With respect to the volume of the crystallizer versus the volume of the system, it is known to one skilled in the art that, for the freeze concentration system, the volume of the crystallizer is the volume of the system. The tanks, pipes etc. are not required and do not impose any limitations. The crystallizer volume and the volume of ice separation device (negligible volume) are the limiting factors with respect to the residence time for avoiding precipitation.

Prior Offer for Sale
(Answering Nestle Br., pp. 20-21, 51)

47. The sales contract dated August 12, 1964 included a complete freeze

concentration system with two crystallizers. Only one of the crystallizers had a hollow shaft. In 1964, the one crystallizer with a hollow shaft was used as a first stage crystallizer and the coffee extract was concentrated from about 24% to 36-37% coffee solids. Furthermore, the crystallizer had several tubes connected in parallel.

48. The Ganiaris '722 concept was developed later and involved concentrating coffee extract from 20-45% and the tubes were "serially connected" in serpentine form, as distinguished from the earlier system where the tubes were parallel and only connected at the beginning and the end.

49. The equipment supplied to General Foods under the September 30, 1965 sales contract did not come within the claims of the '722 patent because,

for example, the equipment did not incorporate the flow rate of "greater than 40% per hour of the volume of each crystallizer" specified in claim 1(d) of my '722 patent.

s/ Neophytos Ganiaris

NEOPHYTOS GANIARIS

Sworn to before me this
11th day of May, 1981

s/ Adam B. Gilbert

Notary Public

UNITED STATES DISTRICT COURT
DISTRICT OF NEW JERSEY

STRUTHERS PATENT CORPORATION, Plaintiff,	Civil Action No. 663-72.
v.	SUPPLEMENTAL AFFIDAVIT IN OPPOSITION TO NESTLE'S MOTION FOR PARTIAL SUMMARY JUDGMENT (GROUP I)
THE NESTLE COMPANY, INC., Defendant,	
v.	
STRUTHERS WELLS CORPORATION, and STRUTHERS SCIENTIFIC AND INTERNATIONAL CORPORATION, Defendants on Counter-claim.	

STATE OF NEW YORK)
) ss.:
COUNTY OF NEW YORK)

NEOPHYTOS GANIARIS, being duly sworn, deposes and says:

1. It has come to my attention that the following statements which I intended to include in my original affidavit in

opposition to Nestle's Group I motion for summary judgment were inadvertently omitted. These statements demonstrate that the subject matter of the Muller '522 patent claims is adequately disclosed in the specifications of Muller '007 (I) and Muller II:

2. The concentrating means are fully disclosed in Example I of Muller '007 (p.0011, Muller II).

3. The agitating means co-acting with concentrating means are disclosed on p. 3, lines 33-36, Muller '007 (p. 0009, Muller II).

4. The centrifuge means are disclosed in Example I of Muller '007 (p.0011, Muller II).

5. Freezing means are disclosed in Example I of Muller '007 (p.0011, Muller II).

6. Means for removing moisture under vacuum from frozen extract by

sublimation are disclosed on p. 4, lines 22-23 and Example I, line 65 of Muller '007 (p. 0012, Example I, Muller II).

7. Heat source means co-acting with vacuum means for heating and drying the frozen extract are disclosed in Example I, lines 67-73 of Muller '007 (Example I, Muller II).

8. Means co-acting with the centrifuge for washing ice separated from the extract are disclosed on p. 3, lines 43-44 of Muller '007 (p.0008, line 13, Muller II).

9. Means co-acting with the centrifuge means for recovering solids from washings are disclosed on p. 3,

lines 19-20 of Muller '007 (p.0008, line 15-17, Muller II).

s/ Neophytos Ganiaris

NEOPHYTOS GANIARIS

Sworn to before me this
1st day of June, 1981

s/ Adam B. Gilbert

Notary Public

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF NEW JERSEY

STRUTHERS PATENT CORPORATION,	
Plaintiff,	Civil Action No. 663-72.
v.	SUPPLEMENTAL AFFIDAVIT IN OPPOSITION TO NESTLE'S MOTION FOR PARTIAL SUMMARY JUDGMENT (GROUP II)
THE NESTLE COMPANY, INC.,	
Defendant,	
v.	
STRUTHERS WELLS CORPORATION, et al.,	
Defendants on Counter-claim.	

STATE OF NEW YORK)
) ss.:
COUNTY OF NEW YORK)

NEOPHYTOS GANIARIS, being duly sworn, deposes and says:

1. I submit this brief supplemental affidavit to clarify certain matters addressed in my original "Group II affidavit" (sworn to May 11, 1981)

which Nestle has attempted to criticize in its reply memorandum.

THE FRENCH PATENT:

2. In Nestle's reply memorandum (pp. 11-12) Nestle asserts that the distinction made in my prior Group II affidavit (regarding the '295 and French patents) between "internal recycling" and "external recycling" is a "distinction without a difference". The difference, which I thought I made clear in paragraph 20 of my prior affidavit is critical to an understanding of the patents in this case. An example will make this clear. If the stream entering the plant contains approximately 20% coffee and approximately 80% water and the object of the process is to obtain a product stream consisting of 50% coffee and 50% water, if there were 100 pounds of stream entering the plant the

following would occur: The product stream leaving the plant would consist of approximately 20 pounds of coffee and approximately 20 pounds of water representing 40% of the original 100% that entered the plant. The remaining stream would consist of approximately 60 pounds of ice, containing less than 5% coffee solids. If this remaining stream were reintroduced into the system (internal recycling), as Nestle suggests, then the end result would be a composition of coffee the same as the stream that entered the plant, namely 20% coffee solids and 80% water and nothing would be accomplished within the plant. By contrast, by further processing the stream outside the above system (external recycling), the desired concentration of 50% coffee solids and 50% water is obtained and the 60% solution of ice with less than 5% concentration of coffee

solids can be utilized in another section of the coffee processing plant, all of which is set forth in greater detail in my '295 patent.

NESTLE'S SECTION 102(f) CLAIM:

3. Nestle attacks ¶5 of my original affidavit by claiming that I did not make clear that the disclosure of my invention in '295 to General Foods took place before the April, 1965 meeting with Maxwell House personnel. Obviously, my affidavit was intended to make that point; however, I wish to eliminate any uncertainty by emphasizing in this supplemental affidavit that the meetings with General Foods discussed in my earlier affidavit at which I disclosed the '295 invention took place in 1965 but prior to the April 21, 1965 meeting.

NESTLE'S SECTION 102(b) CLAIM:

4. Finally, I want to respond to Nestle's statement in its reply memorandum (at p.27) that I don't deny that the subject matter of '295 and '039 was "on sale". The statements in my original affidavit (at ¶¶ 3-4) were intended to convey that, but I will make it clear here again to eliminate any uncertainty: to my knowledge, the features discussed in ¶¶ 3-4 of my earlier affidavit that were not sold to General Foods were not offered for sale to anyone more than one year before the

effective filing dates of the two inventions.

s/ Neophytos Ganiaris

NEOPHYTOS GANIARIS

Sworn to before me this
8th day of June, 1981

s/ Remy S. Ferrano

Notary Public

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF NEW JERSEY

STRUTHERS PATENT CORPORATION,	
Plaintiff,	Civil Action No. 663-72.
v.	SUPPLEMENTAL AFFIDAVIT IN
THE NESTLE COMPANY, INC.,	OPPOSITION TO NESTLE'S MOTION
Defendant,	FOR PARTIAL SUMMARY JUDGMENT
v.	(GROUP IV)
STRUTHERS WELLS CORPORATION, and STRUTHERS SCIENTIFIC AND INTERNATIONAL COPORATION,	
Additional Defendants on Counter-claim.	

STATE OF NEW YORK)
) ss.:
COUNTY OF NEW YORK)

NEOPHYTOS GANIARIS, being duly sworn, deposes and says:

1. This affidavit is submitted to supplement my affidavit in opposition to

Nestle's motion for partial summary judgment (Group IV). In particular, I address Nestle's allegations regarding prior offer for sale of the Howell '126 patent and the Ganiaris '722 patent as set forth in Nestle's reply memorandum.

2. As I stated in my affidavit on Nestle's Group I motion for summary judgment, I was responsible for the design and installation of a plant sold to General Foods Corporation ("General Foods") by Struthers in 1964. This is the Hoboken plant to which Nestle makes reference in its reply memorandum.

3. Nestle argues that the Howell invention was sold to General Foods in 1964 (Nestle Reply Mem., p. 18). Nestle's contentions are in error. As I noted in my original Group IV affidavit, a crystallizer with a hollow shaft was sold to General Foods pursuant to the 1964 contract. That shaft did not, and

was not intended to, "float." Struthers' answer to General Foods' interrogatory 119 is not completely clear on this matter, and if it is inconsistent with the foregoing, the answer is wrong.

4. With respect to the '722 patent, Nestle attempts to impeach the statement in my Group IV affidavit that the concept for the '722 patent "was developed" after the August 1964 sales contract with General Foods, citing Struthers' answer to interrogatory 62 which places the date of conception in April 1964 (Nestle Reply Mem., pp. 46-47). However, conception is not the same thing as development of an invention. Indeed, the same interrogatory cited by Nestle states that the first reduction to practice of the invention was in "early 1965." Accordingly, my statement that the invention "was developed" after the first contract of sale to General Foods is

entirely consistent with the

interrogatory answer which Nestle cites.

s/ Neophytos Ganiaris

NEOPHYTOS GANIARIS

Sworn to before me this
29th day of June, 1981

s/ Adam B. Gilbert

Notary Public

STRUTHERS SCIENTIFIC AND INTERNATIONAL CORPORATION

NEW YORK CITY BRANCH OFFICE

SUBJECT: Maxwell House FreCon Unit

DATE February 15, 1965

ADDRESSEE: J. G. Muller

SENDER: s/ N. Ganiaris
N. Ganiaris

ANSWERING YOUR COMMUNICATION

Original Schedule

On December 28, 1964, the writer, J. J. Pike and J. G. Muller met with Maxwell House - Engineering Division personnel and agreed on the following schedule:

1. Testing of the refrigeration unit on 1/9/65.
2. Start-up of the system with sugar solution on 1/11/65 - 16 hours per day.
3. Start-up of the system with coffee extract on 1/17/65 - 16 hours per day.
4. Initiate the first 120 hours run with coffee extract on 2/1/65 - 24 hours per day.

Furthermore, it was understood that SSI will have all the responsibilities with respect to the start-up operation; however, Maxwell House will provide all the necessary man-power required until the plant is in full operation.

Start-Up Progress

1. Week of 1/10 - 8 hours Day

a) All mechanical work on crystallizers has been completed on 1/14.

b) Process piping and other minor installations of auxiliary piping were completed on 1/16.

c) Refrigeration unit was tested on 1/13-15.

d) Sugar solution was fed to the system in order to make some ice and test the refrigeration unit.

The delay of one week from the original schedule was due to difficulties with the alignment of the crystallizer agitators and also due to incomplete installation.

2. Week of 1/17 - 16 hours Day

a) The following work on centrifuges was completed on 1/17:

1. Change of speed to (approximately) 2300 RPM
2. Change of gaskets to avoid leakage.
3. Alterations on the scroll to avoid rubbing on the basket.

b) Start-up with sugar solution in the first stage on 1/18.

c) Start-up with sugar solution of the entire system on 1/21.

The performance of the system was satisfactory to SSI and MH engineers. However, it was decided to continue on sugar solution until the following process results are accomplished:

1. Concentration of sugar solution to 45% or higher.
2. Ice production rate of (approximately) 500 lbs/hr with losses of less than 2.5%.
3. Continuous operation of the system on automatic control.

3. Week of 1/24 - 16 hours Day

a) The system has been operated continuously for a maximum period of 6 to 8 hours.
b) The design specifications have been met with respect to the ice production, losses and final concentration. The system produced up to 51% sugar solutions during several runs. The maximum ice rate was (approximately) 650 lbs/hr. net plus 300 lbs/hr of wash water. The losses were maintained to less than 2.5% of dissolved solids during only one six-hour run.

c) Several attempts to operate the crystallizers with the automatic temperature controls have not been successful.

The performance of the system was satisfactory to Maxwell House Management. However, SSI and MH engineers decided to remain on sugar solution for a few additional days in order to test the temperature controls again; the conditions appeared favorable since all other problems have been eliminated.

4. Week of 1/31 - 15 hours Day

a) Change of centrifuge screens which have been badly damaged.
b) Work on the centrifuge to avoid any rubbing between the scroll and the basket or the basket and the housing.
c) Work on the flexible connections of the crystallizers in order to avoid any failures during ice build-up in the unit.
d) Installation of the system feed pump.
f) Testing of the temperature automatic controls with sugar solution.

On February 3, SSI and MH engineers decided on the following:

1. Drain the system.
2. Initiate coffee runs on Feb. 4.
3. Continue testing of the temperature controls with coffee extract.
4. Provide orifice meters for flow rate indication.

The first stage was operated for 2 hours on Feb. 4 with coffee extract. The unit was shut-down due to foam and wax.

On February 5, a 4 hour run was made and the first stage was shut-down due to the failure of one flexible connection on the crystallizer. However, a thick layer of wax was observed on the centrifuge screen. There was not any problem with foam.

At a meeting held on Feb. 5, SSI and MH engineers decided on the following:

1. Replace flexible connections on crystallizers as soon as the necessary materials are available.
2. Initiate the design of a permanent dewaxing system and install the necessary equipment as soon as possible.

3. Initiate a 24 hour Day, starting the week of February 7.
4. Replace system's feed pump since it creates considerable foam.
5. Operate the first stage only; until enough 37% extract has been accumulated to start the operation of the second stage.

5. Week of 2/7/ - 24 hour Day

a) On February 8 and 9, several attempts were made to operate the first stage with coffee extract. However, continuous operation for more than 30 minutes was impossible due to wax.

At a meeting held on 2/10, SSI and MH engineers decided on the following:

1. Remove all extract from the unit and clean the system with hot-cleaning solution.

2. Dewax a large quantity of extract and operate the system on a close-cycle until the permanent dewaxing equipment is installed.

3. Initiate laboratory test on wax by MH-Research Division.

4. SSI will design the dewaxing equipment on the basis of the laboratory data.

5. Install all dewaxing equipment by the first week of March.

6. Initiate the first 120 hour run after the dewaxing equipment has been installed.

b) On February 10, two of the shafts of the first stage crystallizer were damaged during the cleaning operation.

At a meeting held on February 11, SSI and MH engineers decided to shut-down and perform the following jobs:

1. Repair shafts of the crystallizers.
2. Install the automatic reset on the refrigeration unit.
3. Re-pipe the crystallizer drains.
4. Replace the flexible connections of the crystallizers.
5. Replace the system feed pump.
6. Install the orifice meters.
7. Start dewaxing the extract late Tuesday 2/16 or early in the morning on 2/17.

Future Schedule

1. Operate the system on a close cycle until 3/5/65.

2. Install dewaxing equipment prior to 3/5/65.

3. Initiate the first 120 hour run on 3/8/65 in order to produce 450 lbs. office per hour and maintain the losses to less than 2.5%.

4. Initiate the second 120 hour run on 3/15/65 in order to produce 600 lbs of ice per hour and maintain the losses to less than 1%.

5. Estimated date of completion is April 2, 1965.

Conclusions and Recommendations

It appears that there is an estimated delay of four weeks due to the following reasons:

1. Late Start-up on Sugar: The start-up date on sugar solution was delayed by one week due to difficulties with the alignment of the agitators and incomplete installations.

2. Man-Power Requirements: Both organizations have failed to provide the man-power that was requested by the writer on January 4, 1965.

SSI had one engineer available from Jan. 11-16, and Jan. 21-27, instead of two engineers in accordance with the original schedule. In addition, only two engineers were available from 2/1 - 2/10.

MH informed the writer on Jan. 14, that from Jan. 17 to Feb. 1 they would provide one engineer per shift and no technicians. With reference to their

over-all program, the FreCon Unit had priority No. 6.

3. Wax in the Extract: This problem did not receive the proper attention from either organization, MH or SSI. Unless the two companies clarify their position with respect to the following points, further delays will occur:

1. Responsibility of technical solution for the wax problem.
2. Responsibility of design and installation for the dewaxing equipment.
3. Relation between the time invested in solving the wax problem and the six months start-up period of the sales contract.
4. Which company will pay the cost of the dewaxing equipment (approximately $5,000).
5. Definition of the start-up time.

At a meeting held on February 10, 1965 (N.G., C.J.S., P. Clyne, and M. Gottesman), the writer expressed the opinion that the time invested for solving the wax problem should not be included in the six month start-up period. During the meeting, it was decided that MH wll continue with the laboratory sale investigations on waxes and SSI will design the equipment on the basis of the MH-Res.Div. data. However, at our level, we would not discuss the responsibilities of the two organizations and we all agreed to review the issue with our Managements.

In the event that SSI Management does not like to enter into any

discussion with MH due to business reasons, please advise the writer with respect to his responsibilities on the wax problem.

NG:gmc

83-132

Office - Supreme Court, U.S.
FILED
JUL 25 1983
ALEXANDER L. STEVAS
CLERK

No. _____

IN THE

Supreme Court of the United States

OCTOBER TERM, 1983

STRUTHERS PATENT CORPORATION,
STRUTHERS WELLS CORPORATION and
STRUTHERS SCIENTIFIC & INTERNATIONAL CORPORATION,
Petitioners,

–against–

THE NESTLE COMPANY, INC.,
Respondent.

PATENT APPENDIX TO PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE THIRD CIRCUIT
Appendix Pages A-684 – A-723

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Feb. 6, 1968 J. D. HOWELL 3,367,126

FLOATING AGITATOR

Filed May 19, 1966

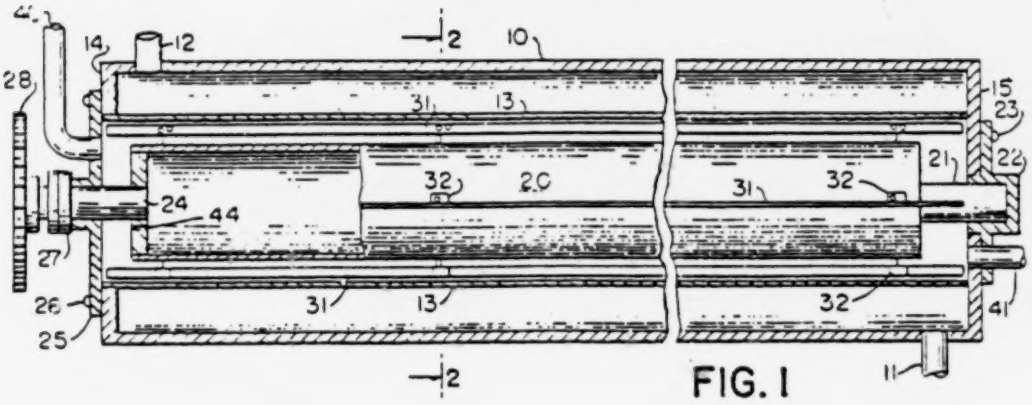


FIG. 1

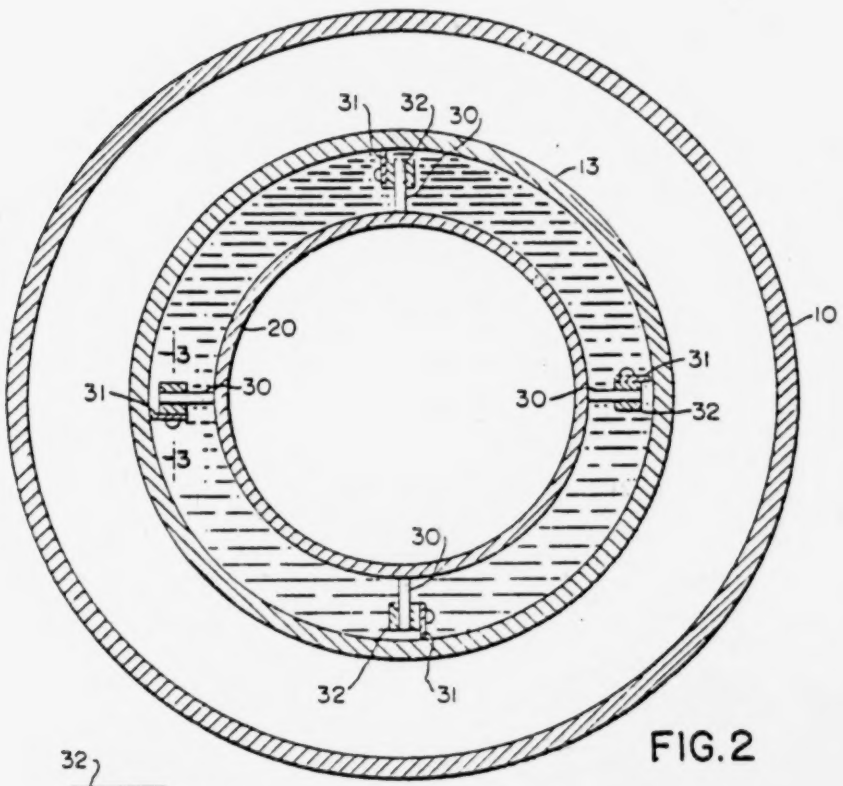


FIG. 2

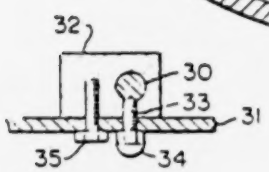


FIG. 3

INVENTOR:

JOHN DONOHOE HOWELL

United States Patent Office 3,367,126 Patented Feb. 6, 1968

3,367,126

FLOATING AGITATOR

John D. Howell, 140 Red Hill Road,
New City, N.Y. 10956

Filed May 19, 1966, Ser. No. 551,252
3 Claims. (Cl. 62—123)

ABSTRACT OF THE DISCLOSURE

A tubular crystallizer for solutions having an agitator shaft, an agitator means and a mounting means which are substantially the same weight per unit of length as the weight of solution displaced by them.

This invention relates in general to freeze concentration, and, more particularly, to tubular crystallizers.

A tubular crystallizer has one or more elongated tubes passing through a tank of refrigerant. A solution to have crystals formed in it is passed through the tube so that crystals may form within the crystallizer tube as heat is transferred therethrough. To prevent crystal buildup on the tube walls, an agitator shaft extends through the crystallizer tube and has longitudinal blades mounted thereon to extend with slight clearance toward the walls of the tube. Oscillatory or rotary motion of the agitator shaft and its blades prevents crystals from forming on the crystallizer tube wall or removes them from the wall to promote uniform crystal growth.

For efficient and greater capacity operation of such crystallizers, the length of the crystallizer tube is an important factor. Heretofore, tube lengths over ten feet were costly and difficult to build, as high bending moments were present in long agitator shafts with the result that shaft alignment in the tubes was difficult. Stiffening of the agitator shafts rendered them heavy and costly. In some applications, bearing shoes to slide on the inner side of the tube walls were provided to support the length of the shafts, but these shoes prevented crystal growth in the area over which they slid and they gave rise to problems of wear, lubrication, etc. Although for some extremely long crystallizer tubes embodying the concept of this invention some intermediate bearing means may be needed, this invention greatly reduces the requirement for such intermediate bearings.

It is, therefore, an object of this invention to provide an agitator or scraper rotor for a tubular crystallizer or the like which is more easily aligned and less subject to bending while in operation.

Another object of this invention is to provide an agitator shaft for a tubular crystallizer which is less costly to fabricate.

A further object of this invention is to provide an agitator rotor or shaft for a tubular crystallizer which has relatively thin walls which are internally pressurized to prevent collapse in service.

Still another object of this invention is to provide an agitator shaft assembly for a tubular crystallizer, which is of substantially the same specific gravity as water, to float within a crystallizer tube.

Yet another object of this invention is to provide an agitator shaft assembly for a tubular crystallizer which greatly reduces the bearing loads of the shaft while it is in service.

Many other objects, advantages, and features of invention reside in the construction, combination, and arrangement of parts involved in the embodiment of this invention and its practice otherwise as may be understood from the following description and accompanying drawing wherein:

FIGURE 1 is a longitudinal, vertical section through a single tube crystallizer according to this invention;

FIGURE 2 is a transverse vertical section taken on line 2—2 of FIGURE 1; and

FIGURE 3 is a section taken on line 3—3 of FIGURE 2 showing one possible form of blade mounting.

Referring to the drawing in detail, a tank 10 has a suitable refrigerant introduced into it through pipe 11 and exhausted through pipe 12. Welded or otherwise fixed within tank 10 is a crystallizer tube 13. Crystallizer tube 13 may extend beyond the end walls 14 and 15 of tank 10 for ease of manifolding. The arrangement shown is merely one illustrative example of a tubular crystallizer. Generally, tank 10 would have a plurality of tubes 13 within it to increase its capacity with an economy of space.

A hollow agitator shaft 20 has an end shaft 21 projecting from one end to be journalled in a bearing 22 fixed over end wall 15 by bolts 23. A drive shaft 24 extends from the other end of shaft 20 to pass through and be journalled in end cap 25 fixed over end wall 14 by means of bolts 26. A suitable packing 27 prevents fluid leakage around shaft 24. A sprocket 28 is mounted on shaft 24 to drive agitator shaft 20.

A number of studs 30 are welded to shaft 20 at intervals along its length. Agitator blades 31 are fixed to the studs 30 by means of the mounting brackets 32 so that the blades 31 are held a spaced distance away from shaft 20 with a slight clearance from the inner surface of crystallizer tube 13.

As shown in FIGURE 3, a mounting bracket 32 is slipped over a stud 30 and fixed to it by means of a threaded locking element 33. The blades 31 may contain laterally elongated apertures allowing the elements 33 passage therethrough. Each blade 31 is then positioned on a row of mounting brackets 32 and held in place by means of blind nuts 34 which are turned down over the ends of the projecting elements 33. When all the blades 31 are thus properly positioned, the blades 31 and the brackets 32 are drilled and tapped to receive the bolts 35 to fix the blades 31 permanently in place. Should it be necessary to adjust the positions of the blades 31 after lengthy service, the nuts 34 may be removed and the elements 33 unscrewed so that the brackets 32 may be repositioned along the studs 30.

While four blades 31 are shown, any desired number may be used. Material to be crystallized is introduced through tube 40 and withdrawn through tube 41. The agitator shaft 20, the blades 31, the brackets 32, and all associated elements are best made of stainless steel for most applications.

As one example of this invention, an agitator shaft 20 thirteen feet long was made of five inch inside diameter pipe, schedule 10, in type 316 stainless steel. This pipe weighed 7.65 pounds per foot. Four blades 31 and fittings weighed 2.2 pounds per foot. Thus total weight per foot was about 9.85 pounds per foot. Buoyancy was about 10.7 pounds per foot. Thus all consideration due to weight when operated in a water solution was eliminated. If heavier schedule 40 five inch inside diameter pipe had been used, it alone would have weighed 14.62 pounds per foot and the assembly would have been 6.12 pounds per foot heavy in a water solution to introduce bending moments.

Further to stiffen the relatively thin walled schedule 10 pipe crystallizer shaft 20 and prevent it from collapsing in service, it may be internally pressurized, for example, to 100 pounds per square inch, with air or a suitable gas through a small channel 44 as shown in FIGURE 1. Channel 44 may then be sealed by a threaded plug or the like. When the crystallizer operates near freezing or below, the internal pressure will still be over 90 pounds per square inch above atmospheric pressure. The use of

the thinner walled pipe in fabricating shafts 20 results in a considerable saving in material costs. Further, the foregoing example is not to be construed to limit the scope of this invention which may be scaled to any crystallizer application.

While this invention has been shown and described in the best form known, it will nevertheless be understood that this is purely exemplary and that modifications may be made without departing from the spirit and scope of the invention.

What is claimed is:

1. In a tubular crystallizer for solutions, having a tank, means introducing a refrigerant into said tank, at least one elongated crystallizer tube passing through said tank, means introducing a solution into one end of said tube to pass through said tube, means withdrawing a solution and crystal slurry from the other end of said tube, wherein an agitator assembly comprises, in combination, an agitator shaft within said tube, bearing means at least at the ends of said shaft rotatably mounting said shaft within said tube, longitudinal agitator means, means mounting said agitator means a spaced distance away from said agitator shaft adjacent to said tube, and means driving said agitator shaft, said agitator shaft being hollow, the improvement in which said agitator shaft, said agitator means, and said mounting means are substantially the same weight per unit of length as the weight of solution displaced by said agitator shaft, said agitator means, and said mounting means per unit of length.

2. The combination according to claim 1 wherein said agitator shaft is tubular and rounded in section.

3. In a tubular crystallizer for solutions having a tank, means introducing a refrigerant into said tank, at least one elongated crystallizer tube passing through said tank, means introducing a solution into one end of said tube to pass through said tube, means withdrawing a solution and crystal slurry from the other end of said tube, wherein an agitator assembly comprises, in combination, an agitator shaft within said tube, bearing means at least at the ends of said shaft rotatably mounting said shaft within said tube, longitudinal agitator means, means mounting said agitator means a spaced distance away from said agitator shaft adjacent to said tube, and means driving said agitator shaft, said agitator shaft being hollow, said agitator shaft, said agitator means, and said mounting means being substantially the same weight per unit of length as the weight of solution displaced by said agitator shaft, said agitator means, and said mounting means per unit of length, the improvement which includes gas under pressure within said hollow tubular agitator shaft.

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LLOYD L. KING, *Primary Examiner.*

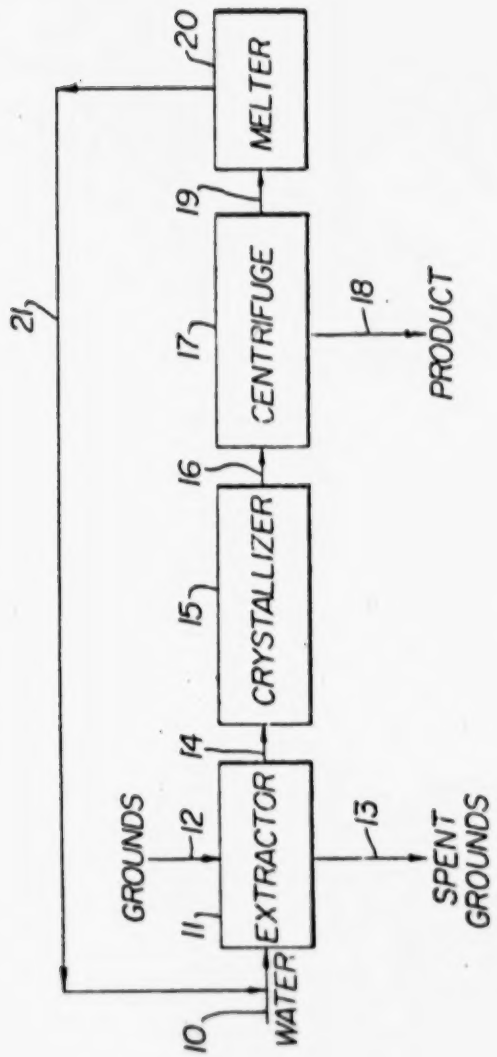
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Sept. 29, 1970 N. GANIARIS 3,531,295

FREEZE CONCENTRATION OF COFFEE EXTRACT

Original Filed Dec. 8, 1965



United States Patent Office 3,531,295 Patented Sept. 29, 1970

3,531,295
FREEZE CONCENTRATION OF COFFEE EXTRACT

Neophytos Ganiaris, Riverdale, N.Y., assignor, by mesne assignments, to Struthers Patent Corporation, Houston, Tex., a corporation of Texas

Continuation of application Ser. No. 512,365, Dec. 8, 1965. This application Apr. 16, 1969, Ser. No. 816,596
Int. Cl. A23f 1/08
U.S. Cl. 99—71 5 Claims

ABSTRACT OF THE DISCLOSURE

A process of freeze concentrating coffee extract is described in which a mixture of ice and coffee is separated in a centrifuge. The ice is thereafter washed to include a finite amount of coffee and melted to recover entrained coffee solids therefrom.

This application is a continuation of my copending application Ser. No. 512,365, filed Dec. 8, 1965 and now abandoned.

This invention relates to an improvement in a process for the preparation of concentrated comestible extracts and is particularly applicable to the preparation of soluble coffee solids, or "instant coffee." More particularly, this invention relates to the preparation of aqueous coffee extracts and the concentration of the extract by partial freezing of the aqueous concentrate.

Soluble or "instant" coffee has been prepared by first extracting coffee beans with hot water and subsequently dehydrating the extract by spray drying under vacuum conditions. This process has met with vast commercial success, but the flavor of the soluble coffee leaves much to be desired. The vacuum conditions employed not only remove water from the extract, but also cause volatile taste and flavor elements of the coffee to evaporate. The resulting soluble product is, therefore, never as good as the extract from which it is prepared.

To improve the flavor of the soluble coffee, it has been often proposed to remove substantial amounts of water in the extract by partially freezing the extract and separating the resulting pure ice crystals from the concentrated extract. This process of partial freezing is then followed by a complete dehydration under vacuum conditions. In this way, the coffee loses less of the volatile components by virtue of the fact that the extract is subject to vacuum conditions for shorter periods of time.

In a preferred embodiment of the concentration process, freshly roasted coffee grounds are extracted countercurrently with hot water and the extract produced is partially frozen by indirect refrigeration in a suitable crystallizer and the resulting slurry of ice and concentrate is subjected to centrifugation to separate the ice from the concentrate. In order for the process to be economical, this separation and the subsequent water wash of the crystals on the centrifuge basket must effect a relatively complete removal of mother liquor from the ice crystals.

This problem of ice-aqueous extract separation is not a problem exclusive to coffee extracts alone, but is also encountered in the preparation of other concentrated extracts of comestible materials. Thus, the process of this invention is also applicable for the improved preparation of concentrated extracts of comestible extracts such as tea, chicory or the like.

It is, therefore, an object of this invention to provide an improved process to preparing extracts of comestible products, and the concentrating of said extracts by partial freezing.

Another object of this invention is to provide an improved process for extracting and concentrating soluble coffee solids wherein the concentrating is by partial freezing of the extract.

The objects of this invention are accomplished by a process which comprises the preparation of a comestible extract by extraction, concentration of the extract by partial freezing of the water therefrom, separating the mixture resulting from the partial freezing, melting the ice having adhering mother liquor, and returning the melt to the extraction step.

A preferred embodiment of this invention is a process which comprises extracting coffee beans at elevated temperature with water, removing part of the water by partial freezing, separating the resulting ice from the mother liquor, and melting the ice with subsequent recycling of the solution produced to the extraction step so as not to expend valuable coffee concentrate which adheres to or is occulded in the ice. In one preferred embodiment of this invention the ice-coffee concentrate slurry is separated using a rotating basket centrifuge.

A particularly preferred embodiment of this invention comprises preparing and concentrating the extract as above, separating ice crystals from the concentrated extract and then washing the ice crystals prior to melting and recycle to the extraction step.

Washing of the ice is normally during centrifugation and is most desirable when the mother liquor of the slurry contains about 20 percent or more dissolved coffee solids by weight. It has been found that at concentrations above about 20 percent the high viscosity of the mother liquor limits the separation efficiency of the centrifuge and excessive amounts of solids remain with the ice which is melted. However, at concentrations below 20 percent washing is not necessary according to this invention.

The initial steps in the process of preparing instant coffee are the same as preparing regular coffee. Following roasting, the coffee is ground, but the granulation may be extremely coarse and, in some cases, fine particles that may result from grinding are sieved out and used elsewhere.

The grounds are placed in closed containers known as extractors. These extractors are set up in batteries with several extractors to a battery.

Ground coffee and hot water are charged into the first extractor. The coffee is then extracted until the necessary materials have been removed from the grounds. The resulting extract is then charged into the second extractor containing fresh coffee. The second extractor is run until extraction is completed. The resulting coffee extract (which is now stronger than ordinary coffee beverage) is placed in the third extractor containing fresh grounds and the brewing process is again repeated.

In commercial plant operation, the process is conducted in a semi-continuous manner, the fresh water coming into an extraction battery first reaches the extractor having the most spent, exhausted grounds and proceeds from there to the next most spent grounds and so on until, finally in the last extractor it reaches the fresh, most recently added grounds. This is known as countercurrent extraction system.

Temperature and pressure in the extractor system will vary greatly. Coffee being produced from fresh grounds is usually processed at low temperature with low pressure. Coffee being produced from spent, exhausted grounds is extracted at high temperature and under high pressure.

The coffee extract to be concentrated by freeze concentration can have any coffee solids content from a few percent such as 10 percent to as high as 40 to 50 percent. That is, there may be as much as 40 to 50 lbs. of coffee solids in the extract for each 100 lbs. of extract. However, the lower the solids content of the extract, the more the water which must be removed during the freeze concen-

tration and drying steps. On the other hand, it has been found that carrying the extraction process to the point where high coffee solids content can be achieved often lowers the flavor of the extract. Thus, a preferred range of coffee solids content of the extract for the practice of this invention is from about 15 to 30 percent coffee solids.

The concentrated coffee solution resulting from extraction is then subjected to concentration by partial freezing of the water therefrom. This freeze concentration process can be conducted in batch, semi-continuous or continuous apparatus according to methods known to the art and improvements of the methods. However, any method of removing the water from the coffee extract by crystallization as ice is applicable to the process of this invention. The resulting slurry of ice and concentrated coffee extract is then subjected to centrifugation to free the concentrated solution of the ice crystals. The resulting ice crystals are ordinarily washed with water or dilute coffee extract to free the ice crystals of mother liquor and the washings may be returned to the freeze concentration process. Normal washing will not completely remove all remaining traces of adhering mother liquod from the ice crystals. Only upon exhaustive washing will the ice crystals be essentially free of mother liquor. However, recycle of wash water containing these valuable dissolved coffee solids would not be economic under conditions of exhaustive washing because the heat transfer surfaces of the crystallization vessels would have to be proportionally larger to provide for greater quantities of ice crystals which must be formed in the vessels. After the ice is removed from the centrifuge it is melted in a suitable vessel. The solution produced will normally contain up to 10 percent by weight of dissolved coffee solids. However, it is preferred to adjust the process conditions so that the melted ice will contain up to 5 percent by weight of dissolved coffee solids. By adjusting the conditions so that the melted ice will contain the lowest amount of dissolved coffee solids possible, it can be seen that an economic advantage can be realized in that less heat transfer surface within the crystallizer will be required. This solution is recycled to the extraction step in lieu of fresh water to prepare additional extract, thus utilizing all of the dissolved coffee solids adhering to the ice crystals from the centrifugation step.

The freeze concentration of the extract can be accomplished in either a single stage or in a plurality of stages each of which comprises a crystallizer in which heat is removed from the coffee extract to form a slurry of ice crystals and concentrated mother liquor. After each crystallization stage, ice is removed from the slurry and the concentrated extract either goes to further processing in the preparation of soluble or powdered coffee or is further concentrated in a subsequent stage of the freeze concentration process. The crystallization of ice from the extract is preferably carried out in a tubular heat exchanger, the outside surfaces of which are cooled by a circulating refrigerant. The internal section of the tube is ordinarily fitted with a shaft on which is located agitator paddles. Alternatively, a conventional scraped surface tubular heat exchanger may be employed. Any acceptable separating device or centrifuge may be employed for separating the concentrated coffee extract from the resulting ice crystals. This centrifuge is the preferred method for separating ice from the mother liquor and ordinarily consists of a rotating basket which contains perforations for allowing passage of the mother liquor. The centrifuge may also be equipped with some means for washing residual mother liquor from the ice crystals.

Referring now to the drawing accompanying this application, freshly roasted coffee grounds enter an extracting apparatus 11 through feed line 12. Water from line 10 also enters the extractor where the coffee solution is brewed. After brewing, the spent grounds are discharged through line 13, and the brew passes through line 14 and enters crystallizer 15 where the temperature is lowered sufficiently to cause ice to form in the extract. The exact degree of concentration depends upon the cooling medium, the temperature, and residence time in the crystallizer. Concentrated slurry of ice and coffee solution is conveyed to the centrifuge 17 by way of line 16. The centrifuge has a rotating basket consisting of an open screen material which allows concentrated coffee solution removal from the outside periphery of the centrifuge through line 18 while the ice passes to the melter 20 by way of line 19. Complete separation of ice and coffee solution is not effected in the centrifuge even though washing may be employed. In the melting apparatus 20, the ice with adhering or occluded concentrated coffee solution is melted to result in dilute coffee solution. This solution leaves the melter through recycle line 21, and enters line 10 where it mixes with the process water for reprocessing.

The following examples are illustrative of the process of this invention.

EXAMPLE 1

Ground coffee and water are charged to a countercurrent extractor and extracted to result in an extract containing 24 percent soluble coffee solids. This extract was continuously metered into a crystallizer wherein 10 pounds per minute of water formed individual ice crystals to result in a slurry of concentrated coffee, having 32 percent soluble coffee solids and ice. This slurry was conveyed to a centrifuge having a basket rotating at 2200 revolutions per minute and a wash water rate of 4 pounds of fresh water per minute. The concentrated solution of coffee was discharged through the perforated rotating basket as product at the rate of 30 pounds per minute and contained 32 percent soluble coffee solids. The ice, upon melting, was found to contain 1.3 percent soluble coffee solids.

EXAMPLE 2

The general procedure of Example 1 was repeated except that the dilute coffee solution resulting from melting the ice was recycled to extractor. The resulting extract having 24.5 percent soluble coffee solids was metered into the crystallizer. The slurry produced was centrifuged and the concentrate leaving the centrifuge as product at the rate of 30 pounds per minute was found to contain 32.5 percent soluble coffee solids, thus providing 13 more pounds of coffee as product per 1000 pounds extracted.

The process of this invention is applicable to any aqueous concentrate of a comestible material which is to be extracted, and then concentrated by formation of ice and subsequent removal of ice. Thus, the process of this invention may also be used in connection with the freeze concentration of tea.

Although the invention has been described with reference to particular embodiments thereof, it is to be understood that various changes may be made without departing from the spirit of the invention as defined by the scope of the attendant claims.

What is claimed is:

1. A process for preparation of concentrates of coffee which comprises:

(a) extracting roast ground coffee with hot water to form an aqueous extract having 15–30% dissolved solids therein;

(b) partially freezing said extract to form a mixture of ice and more concentrated extract having at least 20% dissolved solids therein;

(c) separating said ice from said more concentrated extract by centrifuging under conditions whereby a portion of said more concentrated extract adheres to said ice;

(d) reducing the amount of said more concentrated extract adhering to said ice to a finite amount less than 5% by weight of said ice by washing and centrifuging;

(e) melting said ice to a solution containing dissolved extract which is less than 5% by weight of said melted ice; and

(f) recovering coffee solids from said melted ice.

2. A process according to claim 1 in which the solution from step (e) is used in step (a) to form additional concentrated extract, thereby preventing loss of soluble coffee solids as a result of step (c).

3. A process for the preparation of concentrates of coffee which comprises:

(a) extracting roast ground coffee with hot water to form an aqueous extract having 15–30% dissolved solids therein;

(b) partially freezing said extract to form a mixture of ice and a more concentrated extract having at least 20% dissolved solids therein;

(c) separating said ice from said more concentrated extract by centrifuging under conditions whereby a portion of said more concentrated extract adheres to said ice;

(d) reducing the amount of said more concentrated extract adhering to said ice to a finite amount of dissolved extract solids, less than 5% by weight of said ice, by washing in a centrifuge with fresh water or dilute coffee extract and centrifuging;

(e) melting the ice and combining said ice melt and said adhering extract therein from step (d) with liquid coffee extract to form a combined extract; and

(f) recovering coffee solids from said combined extract.

4. The process of claim 1 wherein the amount of said more concentrated extract adhering to said ice crystals is reduced in step (d) by washing the ice crystals with water resulting in spent water and ice crystals, each having small amounts of said extract.

5. A method according to claim 1 in which coffee solids are recovered from the washings of the ice.

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MAURICE W. GREENSTEIN, Primary Examiner

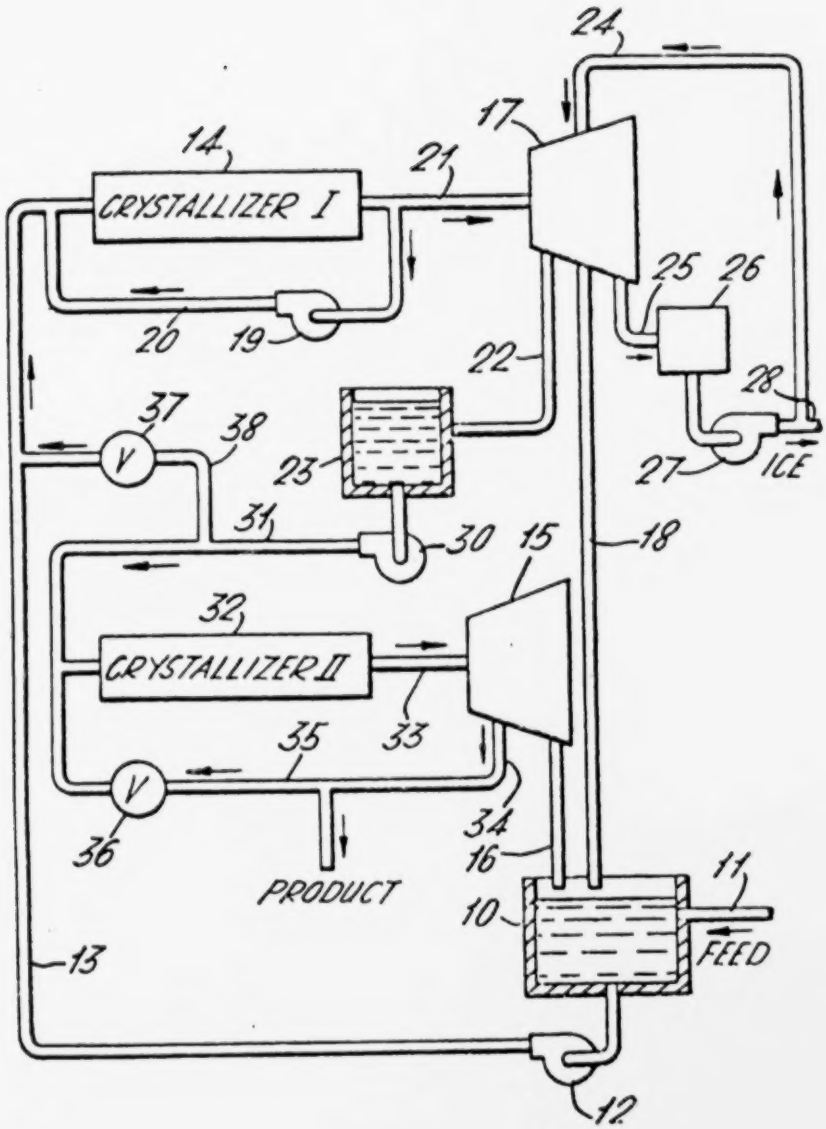
U.S. Cl. X.R.

62—58; 99—77, 199, 205

Nov. 16, 1971 N. GANIARIS 3,620,034

MULTI-STAGE FREEZE CONCENTRATION OF COFFEE

Filed July 11, 1967



United States Patent Office

3,620,034
Patented Nov. 16, 1971

3,620,034

MULTI-STAGE FREEZE CONCENTRATION OF COFFEE

Neophytos Ganiaris, Riverdale, N.Y., assignor to Struthers Patent Corporation, Houston, Tex.

Continuation-in-part of abandoned application Ser. No. 512,365, Dec. 8, 1965, which is a continuation-in-part of application Ser. No. 321,020, Nov. 4, 1963. This application July 11, 1967, Ser. No. 652,532
Claims priority, application Great Britain, July 15, 1966, 31,831/66
The portion of the term of the patent subsequent to Nov. 8, 1983, has been disclaimed
Int. Cl. B01d 9/04; A23f 1/08
U.S. Cl. 62—58 5 Claims

ABSTRACT OF THE DISCLOSURE

In a staged freeze concentration process for concentrating coffee solution, ice crystals are removed from the system after the first stage from less concentrated coffee solution. Ice crystals removed from the more concentrated coffee solution in the second stage are added to incoming feed. Coffee solution from which ice crystals are separated in the second stage is removed from the system as a product.

This application is a continuation-in-part of application Ser. No. 512,365, filed Dec. 8, 1965, and forfeited on June 20, 1969, which is a continuation-in-part of Ser. No. 321,020, filed Nov. 4, 1963 and now Pat. No. 3,283,522 of Nov. 8, 1966.

BACKGROUND OF THE INVENTION

In the freeze concentration of coffee, a coffee solution is passed through a series of crystallizers to provide a slurry of ice crystals in a concentrated coffee solution. The ice crystals are separated from the concentrated coffee solution in a centrifuge and washed. Even when crystals of a uniform and optimum size are produced, considerable valuable coffee solids may be lost with ice crystals from which it is difficult to remove the more concentrated coffee solution.

SUMMARY OF THE INVENTION

This invention provides for the centrifuging of ice crystals from a multi-stage freeze concentration system for coffee which provides coffee solution at a concentration of over 37% from a feed at a concentration of about 26% by centrifuging and removing the ice crystals from the system in a first centrifuge which separates crystals from a coffee solution at a concentration of less than 30% leaving an early or first stage crystallizer. The solution from the first centrifuge is passed through an additional crystallizer and a second centrifuge from which a product stream of a coffee solution of over 37% is withdrawn, ice from the second centrifuge being recycled by being added to the feed.

BRIEF DESCRIPTION OF THE DRAWING

The figure of the drawing is a schematic diagram of a system for the freeze concentration of coffee according to this invention.

Referring to the drawing in detail, a feed solution of 26% by weight coffee dissolved solids enters feed tank 10 through pipe 11. Pump 12 draws this solution from feed tank 10 and passes it through pipe 13 to enter crystallizer 14. The solution passing through pipe 13 from tank 10 will be from 13% to 24% coffee dissolved solids. This lower coffee content results from the fact that the solution is diluted because ice enters tank 10 from centrifuge 15 through pipe 16 and because wash water from centrifuge 17 passes into tank 10 through pipe 18. Thus wash water and the melted ice dilute the feed solution entering crystallizer 14.

A pump 19 may partially recirculate through pipe 20 the slurry of ice crystals and coffee solution leaving crystallizer 14 until the coffee solution contains 26 to 30% coffee dissolved solids. This slurry then passes through pipe 21 to enter centrifuge 17. Mother liquor is separated from the ice crystals in centrifuge 17 and passes through pipe 22 to the mother liquor tank 23. Wash water enters centrifuge 17 through pipe 24 to wash ice crystals therein and flow to tank 10 through pipe 18. Ice passes from centrifuge 17 through pipe 25 to enter the ice tank 26. Some ice melts in tank 26 to be recirculated by pump 27 through pipe 24 as wash water. Ice passes from the system through pipe 28.

The 26 to 30% coffee dissolved solids solution in mother liquor tank 23 is pumped by pump 30 through pipe 31 to the second stage crystallizer 32. A slurry of ice crystals in at least a 37% coffee solution leaves crystallizer 32 through pipe 33 to enter centrifuge 15. The 37% coffee dissolved solids solution leaves centrifuge 15 through pipe 34 as a product. By means of pipe 35 and valve 36, this solution may be recirculated through crystallizer 32.

By means of valve 37 and pipe 38 mother liquor may be recirculated through crystallizer 14. This recirculation is required to raise the concentration of the solution in pipe 13 entering crystallizer 14 above the concentration of the feed while keeping it below 30% coffee dissolved solids. Excessive recirculation through pipe 20 could also serve to concentrate the feed from pipe 13, but this would result in too high a percentage of ice crystals in the crystallizer 32 which would reduce the rate of crystal growth. Recirculation through pipes 20 and 38 should be balanced and controlled so that the percentage of ice crystals by weight in solution in crystallizer 14 is between 20 and 30%. If the percentage of ice crystals is too low, below 15% by weight, as when pipe 20 is not used for recirculation, excessive nucleation and small and non-uniform crystals result which are difficult to centrifuge. When centrifuging ice crystals from the system from a 26 to 30% solution as described, less than 1% coffee solids by weight will be lost with the ice.

While this invention has been shown and described in the best form known, it will nevertheless be understood that this is purely exemplary and that modifications may be made without departing from the spirit and scope of the invention except as it may be more limited in the appended claims wherein:

What is claimed is:

1. A process for the preparation of a concentrate of coffee from a liquid containing about 24% coffee solids which comprises (a) partially freezing aqueous coffee extract in at least two serially connected crystallizer passes to form a mixture of about 20–30% by weight of ice and a concentrated extract, (b) separating said ice by centrifugation from said mixture under conditions whereby a portion of said concentrated extract adheres to said ice, (c) reducing the amount of said concentrated extract adhering to said ice by centrifuging and by washing in the centrifuge with addition of wash water or melted ice (d) melting the ice to form a dilute solution which contains the coffee which had been adhering to the ice and (e) recovering coffee solids from said melted ice.

2. In the freeze concentration of coffee according to claim 1, the steps of:

(a) removing ice from the concentrated coffee solution and mixing the ice with feed solution to melt therein; and

(b) removing the concentrated coffee solution from the system as a product.

3. The process according to claim 2 with the additional steps of:

(a) melting to some extent the ice removed from coffee solution to form a wash liquid;

(b) washing ice with the wash liquid; and

(c) recycling the wash liquid after washing ice into the feed.

4. The process according to claim 3 with the additional step of:

recycling at least some of the concentrated coffee solution into the feed.

5. A process as claimed in claim 1 in which coffee solids are recovered from wash water after washing.

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NORMAN YUDKOFF, Primary Examiner

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U.S. Cl. X.R.

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PATENTED JAN 25 1972

3,636,722

SHEET 1 OF 2

Fig. 1.

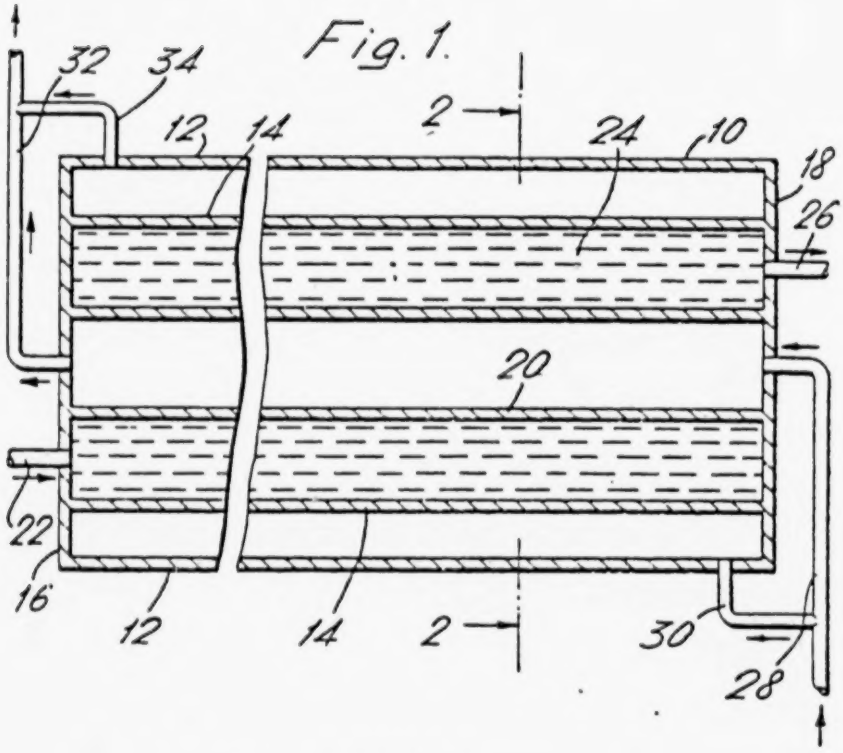
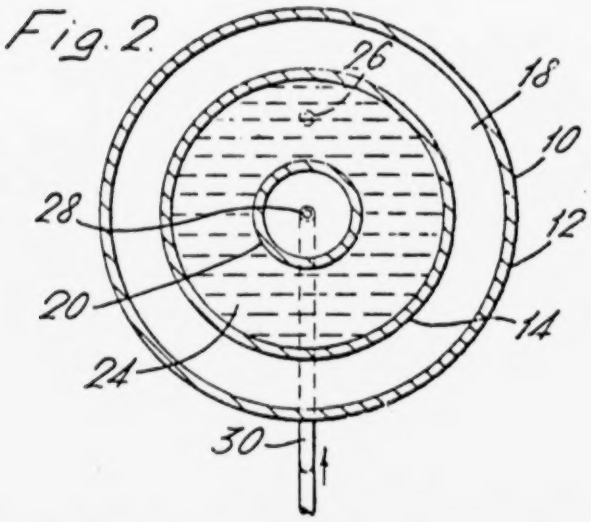


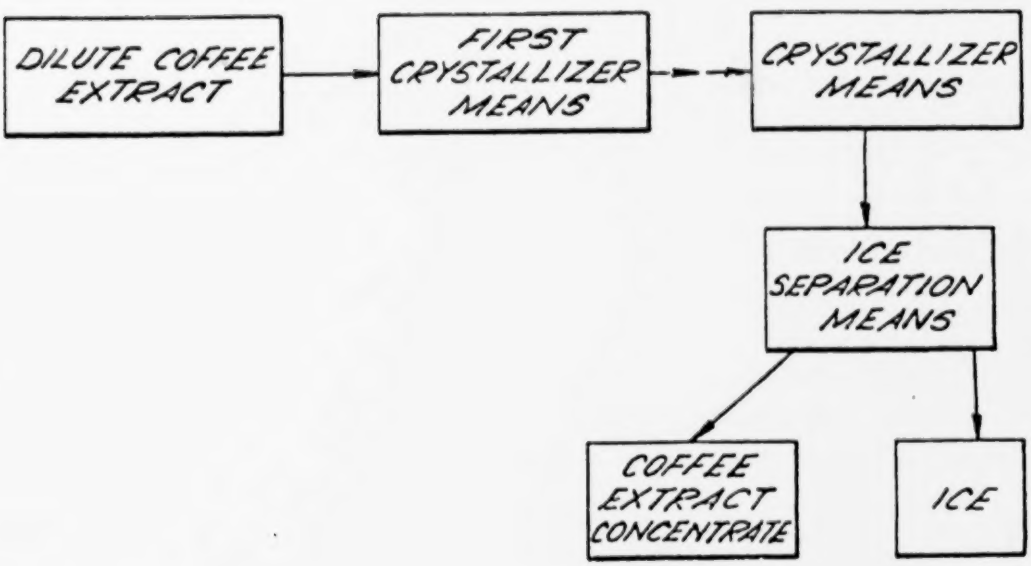
Fig. 2.



PATENTED JAN 25 1972 3,636,722

SHEET 2 OF 2

Fig. 3.



United States Patent

Ganiaris

[11] 3,636,722

[45] Jan. 25, 1972

[54] CONCENTRATION OF COFFEE

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[73] Assignee: Struthers Patent Corporation, Huntsville, Tex.

[22] Filed: Nov. 25, 1969

[21] Appl. No.: 879,843

Related U.S. Application Data

[62] Division of Ser. No. 651,451, July 6, 1967, abandoned.

[30] **Foreign Application Priority Data**

July 15, 1966 Great Britain 31,832/66

[52] U.S. Cl. ..... 62/123, 99/199, 99/236 C

[51] Int. Cl. A23f 1/06

[58] Field of Search ..... 62/123, 340, 354, 58; 34/5; 99/236, 316, 199 C, 205 C

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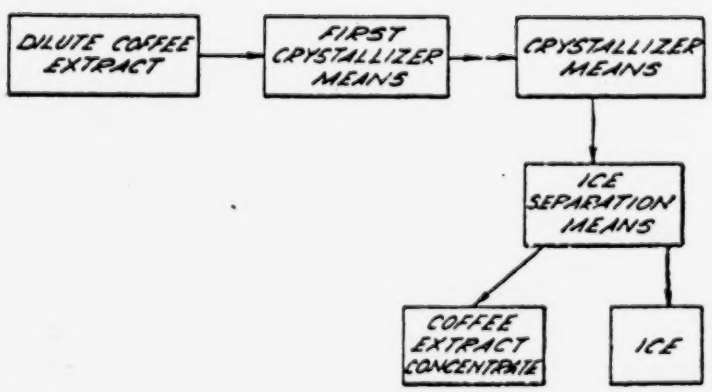
Primary Examiner—William E. Wayner

Attorney—William A. Drucker

[57] **ABSTRACT**

In a system for the freeze concentration of coffee, the ratio of the area of the heat transfer surfaces of the crystallizer to the volume of the crystallizer should be between 7:1 to 10:1. To accomplish this ratio, a crystallizer having both a jacket and a central passage for refrigerant may be used.

2 Claims, 3 Drawing Figures



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CONCENTRATION OF COFFEE

This application is a division of my copending application Ser. No. 651,451, filed July 6, 1967, now abandoned.

BACKGROUND OF THE INVENTION

It has been found that coffee solids are precipitated out of a water solution when the solution is cooled to low temperatures between 20° and 32° F. and maintained at these temperatures for prolonged periods of time.

In the freeze concentration of coffee solutions containing from 20 to 45 percent solids, the solution must be cooled in the freeze concentration system to temperatures of 20° to 32° F. Thus, residence time of a coffee solution in a crystallizer and in associated ice crystal removing apparatus and piping should not be for a prolonged time. With a prolonged residence time, coffee solids will be precipitated out of solution in large quantities. The formation of precipitates in the freeze concentration of coffee should be minimized for three reasons.

1. The precipitate tends to be removed from the system with ice crystals leaving a final product of inferior flavor and aroma.
2. The precipitate affects the efficiency of the crystallizer since it is deposited on heat transfer surfaces.
3. The precipitate plugs up centrifuge screens and other ice crystal separating apparatus.

SUMMARY OF THE INVENTION

To avoid the problem of precipitation, a freeze concentration system for coffee extracts should be designed to have a residence time of less than 2.5 hours. Therefore, the entire volume of the freeze concentration system (pipelines, tanks, crystallizers, etc.) should be less than 2.5 times the hourly flow rate through the system. Pipelines and other elements can be designed on the basis of known technology and engineering principles to provide a minimum volume and a short residence time. However, in the case of crystallizers, other factors must be considered to determine the optimum residence time since the growth of ice crystals is a function of the time spent within the crystallizers.

The heat of crystallization must be removed through heat transfer surfaces of a crystallizer. These surfaces, of course, define the size of the crystallizer for a given temperature gradient and heat transfer coefficient. The design limits, heat transfer coefficients, degree of gradiation, and temperature differences are established on the basis of their effect on ice crystal growth.

The only known design parameter that affects both the ice crystal growth and the precipitate formation is the residence time within the crystallizer. Therefore, a relation of heat transfer area to volume for a crystallizer must be determined in order to insure a maximum crystal growth rate without precipitate formation.

This design parameter for a freeze concentration system for coffee extracts has been found to be a ratio between 7:1 to 10:1 for the area of the heat transfer surfaces to the volume of the freeze concentration crystallizer. To accomplish this design parameter, a crystallizer may have a jacket and a central passage for refrigerant to increase the heat transfer area for a given volume.

Thus it may be seen that this invention provides a more efficient freeze concentration system for coffee solutions.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a longitudinal, vertical section through a crystallizer according to this invention with a central portion broken away; and

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FIG. 2 is a transverse vertical section taken on line 2—2 of FIG. 1;

FIG. 3 is a flow chart showing plural crystallizers used in a coffee concentration system.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawing in detail, a crystallizer 10 has an outer shell 12 and an inner shell 14 extending between the end plates 16 and 18. A cylindrical inner refrigerant passage 20 extends within inner shell 14 between plates 16 and 18. Coffee solution 24 is introduced through pipe 22 and a slurry of coffee solution and ice crystals is withdrawn through pipe 26 from the annulus formed between passage 20 and inner shell 14. Refrigerant enters outer shell 12 and one end of passage 20 through the pipes 28 and 30 and refrigerant is withdrawn through the pipes 32 and 34.

While not shown, agitator blades or the like may be placed between passage 20 and shell 14 to prevent crystals from forming on these heat transfer surfaces. In addition, a series of crystallizers may be used in sequence if desired. This particular crystallizer construction enables the crystallizer volume for a given amount of ice crystal production to be reduced.

However, in the design of any crystallizer for the freeze concentration of coffee without precipitate formation, there should be a certain ratio, within limits, between the volume of the crystallizer and the heat transfer area. This may be expressed as the following design equation:

$$\frac{\text{Volume of the crystallizer in cubic feet}}{\text{Heat transfer area in square feet}} = \frac{1}{7} \text{ to } \frac{1}{10} \text{ feet}$$

While this equation is valid for all systems for the freeze concentration of coffee without forming precipitates, the crystallizer shown will require a lower volume for a given crystal product and thus reduce the total cost of the apparatus.

While this invention has been shown and described in the best form known, it will nevertheless be understood that this is purely exemplary and that modifications may be made without departing from the spirit and scope of the invention except as it may be more limited in the appended claims.

What is claimed is:

1. An apparatus system for concentration of aqueous liquid coffee solution containing from 20 to 45 percent dissolved coffee solids, comprising:
   a. plural serially connected crystallizer means, each having an outer shell, and an inner shell having a cylindrical heat transfer surface, forming ice therein at coffee temperatures down to 20° F.,
   b. inlet and outlet means coupled to said crystallizer means to allow refrigerant to pass across the outside of the heat transfer surface of the inner shell, and coffee solution to pass across the inside of the heat transfer surface of the inner shell through a crystallization zone having an annular cross section,
   c. the ratio of the total annular volume of said crystallizer means inner shell to the area of said inner shell heat transfer surface being sufficient to avoid precipitate formation from coffee, said annular volume being provided by a hollow axial central cylindrical member within said inner shell,
   d. means to provide a flow rate of said coffee solution through the annular crystallization zone of each said crystallizer means of greater than 40 percent per hour of the volume of each said crystallizer means, and
   e. means separating ice from said coffee extract after passage through at least two serially connected crystallizer means.

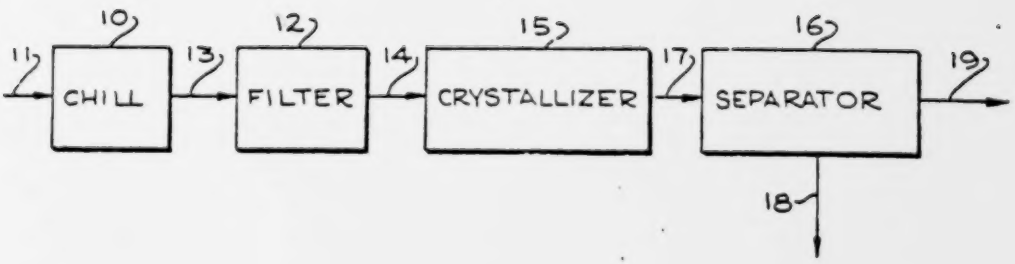
2. An apparatus system according to claim 1 including coffee agitation means within said annular crystallization zone.

* * * * *

April 30, 1968 R. G. REIMUS ET AL 3,381,302

FREEZE CONCENTRATION OF COFFEE EXTRACT

Filed Dec. 2, 1965



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Patented Apr. 30, 1968

3,381,302

FREEZE CONCENTRATION OF COFFEE EXTRACT

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Filed Dec. 2, 1965, Ser. No. 511,173
3 Claims. (Cl. 99—71)

ABSTRACT OF THE DISCLOSURE

A process is described for the concentration of comestible liquids by partially freezing ice therefrom and separating the ice from the concentrated liquid. Prior to freezing the ice the liquid is chilled to a temperature no lower than about 32° F. which is near to, but substantially above, the freezing point and the liquid is prefiltered so that waxes and similar material are removed before the ice is formed.

This invention relates to an improvement in a process for the preparation of concentrated comestible liquids and liquid extracts and is particularly applicable to the preparation of soluble coffee solids or "powdered coffee." More particularly, this invention relates to the pre-treatment of liquids and liquid extracts as a step preliminary to removal of water from the extract by a freezing process.

Soluble, or "powdered," coffee has been prepared by first extracting coffee beans with hot water and subsequently dehydrating the extract by spray drying under vacuum conditions. This process has met with vast commercial success, but the flavor of the soluble coffee leaves much to be desired. The vacuum conditions employed not only remove water from the extract, but also cause volatile taste and flavor elements of the coffee to evaporate. The resulting soluble product is, therefore, never as good as the extract from which it is prepared.

To improve the flavor of the soluble coffee, it has been often proposed to remove substantial amounts of water in the extract by partially freezing the extract and separating the resulting pure ice crystals from the concentrated extract. This process of partial freezing is then followed by a complete dehydration by evaporation of water which may be conducted under vacuum conditions. In this way, the coffee loses less of the volatile components by virtue of the fact that the extract is subject to evaporation conditions for shorter periods of time.

In a preferred embodiment of the freezing process, the coffee extract is partially frozen by indirect refrigeration in a suitable crystallizer and the resulting slurry of ice and concentrate is subjected to centrifugation to separate the ice from the concentrate. In order for the process to be economical, this separation and the subsequent water wash of the crystals on the centrifuge basket must effect a relatively complete removal of mother liquor from the ice crystals.

However, when coffee extract is cooled to near its initial freezing point, a gummy or waxy solid material often precipitates from solution prior to ice formation. This wax or tar is carried along with the ice crystals and coffee extract into the centrifuge and collects on the centrifuge basket, eventually plugging the basket and preventing the complete separation of ice from concentrated extract.

This problem of the precipitation of insoluble materials in the coffee extract is not a problem exclusive to coffee extracts alone, but is also encountered in the preparation of other concentrated extracts of comestible materials. Thus, the process of this invention is also applicable to the preparation of concentrated extracts of such

comestible materials as tea, grape juice, apple juice, beer and orange juice.

It is therefore an object of this invention to provide an improved process for the concentration of comestible liquids and liquid extracts by partial freezing of the liquid or liquid extracts.

Another object of this invention is to provide a process in which a comestible liquid or liquid extract, free of insoluble elements at the freezing temperature of ice, is subjected to freeze concentration.

Yet another object of this invention is to provide an improved process for the concentration of coffee extract by partial freezing of the extract.

Still another object of this invention is to provide a process in which coffee extract, free of insoluble elements at the freezing temperature of ice, is subjected to freeze concentration.

The objects of this invention are accomplished by a process which comprises preparing a comestible liquid or liquid extract, cooling the liquid to precipitate material insoluble at the temperature at which ice forms therein, removing insolubles from the resulting mixture and then subjecting the insoluble-free mixture to concentration by partial freezing of water therefrom.

A preferred embodiment of this invention is a process which comprises extracting coffee beans at elevated temperatures with water to produce a coffee extract, cooling the extract to precipitate materials insoluble at the temperature at which ice forms in the brew, removing insolubles from the resulting mixture and then subjecting the insoluble free mixture to concentration by partial freezing of water therefrom.

The initial steps in the process of preparing instant coffee are the same as preparing regular coffee. Following roasting, the coffee is ground, but the granulation may be extremely coarse and, in some cases, fine particles that may result from grinding are sieved out and used elsewhere.

The grounds are placed in closed containers known as extractors. These extractors are set up in batteries with several extractors to a battery.

Ground coffee and hot water are charged into the first extractor. The coffee is then extracted until the necessary materials have been removed from the grounds. The resulting extract is then charged into the second extractor containing fresh coffee. The second extractor is run until extraction is completed. The resulting coffee extract (which is now stronger than ordinary coffee beverage) is placed in the third extractor containing fresh grounds and the brewing process is again repeated.

In commercial plant operation, the process is conducted in a semi-continuous manner, the fresh water coming into an extraction battery first reaches the extractor having the most spent, exhausted grounds and proceeds from there to the next most spent grounds and so on until, finally, in the last extractor it reaches the fresh, most recently added grounds. This is known as a counter-current extraction system.

Temperature and pressure in the extractor system will vary greatly. Coffee being produced from fresh grounds is usually processed at low temperature with low pressure. Coffee being produced from spent, exhausted grounds is extracted at high temperature and under high pressure.

The coffee extract to be concentrated by freeze concentration can have any coffee solids content from a few percent to as high as 40 to 50 percent. That is, there may be as much as 40 to 50 lbs. of coffee solids in the extract for each 100 lbs. of extract. However, the lower the solids content of the extract, the more the water which must be removed during the freeze concentration and dry-

ing steps. On the other hand, it has been found that carrying the extraction process to the point where high coffee solids content can be achieved often lowers the flavor quality of the extract. Thus, a preferred range of coffee solids content of the extract for the practice of this invention is from about 10 to 30 percent coffee solids.

In prior art processes, after leaving the extractor system, the coffee extract is clarified of sediment while still at an elevated temperature. One of the most common methods of clarification is by means of a centrifuge in which the coffee liquid is passed through a rapidly rotating cylinder and discharges the clear liquid. Another method is by means of a pressure pump forcing the concentrate through porous paper or cloth.

However, according to one embodiment of the process of this invention, the hot coffee extract is first chilled to near the freezing point so that waxes, tars and gums which are soluble in the hot extract are precipitated therefrom. The cold extract is then subjected to filtration or centrifugation to free it, not only of the precipitated gums, tars and waxes, but also from any sediment resulting from the extraction process.

Because the initial freezing point of the coffee extract is dependent on the total coffee solids content of the extract, the temperature to which the extract should be chilled to precipitate the gums, tars and waxes varies with the exact nature of the extract. Ordinarily, however, minimum temperatures of 40° F. and below may be employed in the process of this invention. If it is not desired to form ice in the extract during the precipitation process, the temperature to which the extract is chilled should not be below the initial freezing point. For a coffee extract having 30 wt. percent coffee solids, the temperature is about 27° F.

In practice, it has been found that the tars, waxes and gums will begin to precipitate from coffee at temperatures as high as about 80° F. and that the major portion of insolubles will precipitate at temperatures above 32° F. Thus, an embodiment of this invention comprises chilling the extract to between 80 and 32° F. prior to filtration and freeze concentration. Preferred temperatures for the chilling operation are between about 45 and 32° F. because this temperature range insures virtually complete removal of insolubles.

The coffee extract may be chilled by any convenient means. However, it is preferred to keep the extract under agitation so that the wax and gums formed during the precipitation step do not adhere to the heat transfer surface of the refrigeration means used to precipitate. If desired, the chilled extract may be held at the low temperature for from a few seconds to several or many hours before the waxes, tars and gums are removed, either by centrifugation or filtration. The formation and precipitation of tars, gums and waxes is often time-dependent and complete precipitation may require holding the material at the low temperature employed until the process is complete. Thus, when conducting the process of this invention in a continuous fashion, the time elapsed between the chilling to precipitate waxes and actual separation of the waxes, tars and gums from the chilled coffee extract will depend on the exact nature of the extract.

In some coffee extracts, continued exposure to low temperature will also cause the formation of a non-waxy particulate precipitate. This particulate precipitate forms after the formation of insoluble tars, waxes and gums and does not interfere with the centrifugal separation of ice from concentrated coffee extract after the freeze concentration process. However, such exposure to low temperatures sufficient to cause this particulate precipitate should be avoided because it is tantamount to degradation of the coffee extract. The resulting concentrated product, after this degradation, is not as satisfactory to the consumer as coffee produced from extract which has been chilled only sufficiently to cause the precipitation of tars, gums and waxes.

Depending upon the exact nature of the coffee blend employed in preparing the extract and the extract itself, from less than 0.5 to about 5 percent by weight of tars, gums and waxes will form during the precipitation step. Although most of the gums, waxes and tars which will form from the coffee extract form at near the initial freezing point of the extract, more may form after the extract is subjected to freeze concentration. Thus, another embodiment of this invention comprises cooling the coffee extract to below the initial freezing temperature to precipitate the insoluble wax, tar or gum and forming a minor amount of ice in the extract. The extract can then be freed of the waxes and tars by filtration, decantation or centrifugation. In this embodiment of the invention, the minor portion of ice formed can be removed along with the waxes and tars, or the extract can be slightly warmed to allow the ice to melt prior to removal of the waxes and tars by filtration, decantation or centrifugation.

The tars, waxes or gums produced by the chilling of the coffee extract can be removed in any convenient fashion as pointed out above. The chilled extract may be held at the chilled temperature until such time as the precipitate settles to the bottom of the container and the precipitate-free portion of the solution can be decanted and then subjected to further processing. Alternatively, the chilled extract may be processed in the same manner as hot coffee extract which is to be freed from sediment. Thus, centrifugation, batch or continuous, or pressure filtration techniques; all well known to the art, may be employed to separate the extract from the precipitate.

After being freed from the precipitate, the resulting precipitate-free coffee extract is then subjected to concentration by partial freezing of the water therefrom. This freeze concentration process can be conducted in batch, semi-continuous or continuous apparatus according to methods known to the art and improvements of the methods. However, any method of removing the water from the coffee extract by crystallization as ice is applicable to the process of this invention. The resulting slurry of ice and concentrated coffee extract is then subjected to centrifugation to free the concentrated solution of the ice crystals. The resulting ice crystals are ordinarily washed with water or dilute coffee extract to free the ice crystals completely of residual mother liquor and the washings may be returned to the freeze concentration process. The practice of this invention has the advantage that the centrifuge basket does not become plugged with precipitated tars and waxes and the separation and washing processes are facilitated in their efficiency.

The freeze concentration of the wax, tar and gum free comestible liquid or extract can be accomplished in either a single stage or in a plurality of stages, each of which comprises a crystallizer in which heat is removed from the coffee extract to form a slurry of ice crystals and concentrated mother liquor. After each crystallization stage, ice is removed from the slurry and the concentrated extract either goes to further processing in the preparation of soluble or powdered coffee or is further concentrated in a subsequent stage of the freeze concentration process. The crystallization of ice from the extract is preferably carried out in a tubular heat exchanger, the outside surfaces of which are cooled by a circulating refrigerant. The internal section of the tube is ordinarily fitted with a shaft on which is located agitator paddles. Alternatively, a conventional scraped surface tubular heat exchanger may be employed. Any acceptable separating device or centrifuge may be employed for separating the concentrated coffee extract from the resulting ice crystals. This centrifuge is the preferred method for separating ice from the mother liquor and ordinarily consists of a rotating basket which contains perforations for allowing passage of the mother liquor. The centrifuge may also be equipped with some means for washing residual mother liquor from the ice crystals.

Referring now to the drawing accompanying this application, an aqueous comestible extract enters a chilling or cooling apparatus 10 through feed line 11. The chiller may be a conventional refrigeration unit, a continuous tubular heat exchanger or the chilling operation may be conducted in a batch manner by placing containers of extract in a refrigerated room. The chilled extract is then fed to the filter 12 through line 13. The filter apparatus may be a conventional batch filtration unit or, where the precipitated wax or tar can be handled on a centrifuge basket, may comprise a rotating basket centrifuge or ordinary laboratory or batch-type centrifuge. The filtered extract; now free of tars, gums and waxes; is conveyed through line 14 to the tubular crystallizer 15 where the temperature is lowered sufficiently to cause ice to form in the extract. The exact degree of concentration depends upon the cooling medium and temperature on the outside of the crystallizer 12 and the residence time in the crystallizer. Concentrated slurry of ice and mother liquor is then conducted to a separating apparatus 16 through the line 17. The separating apparatus 16 is preferably a rotating basket centrifuge in which the basket is an open screen material which allows concentrated mother liquor to be removed from the outside periphery of the centrifuge through the line 18 while ice, preferably reslurried in either water or feed extract, is removed via line 19.

As pointed out above, the crystallizing concentration operation may be conducted in a plurality of stages.

The following examples are illustrative of the process of this invention.

Example 1

A batch of coffee extract containing 24 percent coffee solids was pre-cooled to below 40° F. and admitted to a tubular heat exchanger having an internal agitator. The coffee extract was fed to the heat exchanger at the rate of 3 gallons per minute and coffee extract was recirculated around the heat exchanger until ice crystals had formed due to the cooling internally. Recirculation of slurry and mother liquor was continued as coffee extract was fed to the crystallizer, the internals of which were maintained at a temperature of 27° F. A slurry of ice and coffee liquor containing about 30 percent coffee solids was then continuously removed from the crystallizer and fed to a continuous type rotating basket centrifuge. The centrifuge basket was in the form of a perforated screen which allowed coffee liquor to pass through the ice cake, thus separating the ice from the coffee liquor. After 10 minutes of operation, the centrifuge screen plugged with tars and waxes which were precipitated from the coffee extract during the cooling and crystallization process. This caused the operation to stop, due to improper separation of ice and mother liquor.

This procedure is repeated except that the extract is fed to the crystallizer without first pre-chilling. Tars and gums form along with the ice and the centrifuge plugs in the same manner as if the extract had been pre-chilled.

Example 2

The general procedure of Example 1 was repeated except that the chilled coffee extract was filtered through fine cheesecloth prior to introduction into the crystallizer. In this filtration process, approximately 1.9 percent of the original extract was removed as tars, gums or waxes. The resulting precipitate-free coffee liquor was then admitted to the crystallizer vessel and the slurry produced in the crystallizer was centrifuged continuously. The ice-mother liquor separation was not impeded by plugging of the centrifuge screen with precipitate.

Excellent results are also obtained when coffee liquor to be concentrated is pre-cooled from 80 to 36° F., and when the extract has from 12 to 32 percent coffee solids.

Example 3

A tea extract containing 6.8 percent tea solids, at above 80° F. after extraction, is cooled in a heat exchanger to 36° F. The cooled material is then filtered through a filter press and the resulting tar-free extract is freeze concentrated in a tubular crystallizer. The resulting ice-concentrated tea slurry is easily separated on a rotating basket screen-type centrifuge as described above.

The process of this invention is applicable to any aqueous comestible liquid material or liquid extract which is to be concentrated by formation of ice and subsequent removal of ice. Thus, the process of this invention may be used in connection with the freeze concentration of coffee, tea, grape juice, orange juice, beer, vinegar and the like.

Although the invention has been described with reference to particular embodiments thereof, it is to be understood that various changes may be made without departing from the spirit of the invention as defined by the scope of the appended claims.

We claim:

1. In a process for the concentration of liquid coffee extract which forms insoluble precipitate at above the temperature at which ice forms therein and which contains therein about 10 to 40% dissolved solids comprising partial freezing of said liquid extract to form ice and concentrated liquid extract, the improvement which comprises precooling said liquid extract to a temperature between about 32 to 45° F. to precipitate insoluble material therefrom, storing said liquid extract in said temperature range until sufficient precipitate occurs without substantial adverse flavor effect, removing said insoluble material from said liquid extract, subsequently subjecting said liquid extract to reduced temperature to form ice therein, and separating ice from said concentrated extract.

2. The process of claim 1 wherein said coffee extract contains from 15 to 30 percent coffee solids.

3. The process according to claim 1 in which the liquid is kept under agitation during the precooling and precipitation to prevent adherence of wax and gum to the heat transfer surface.

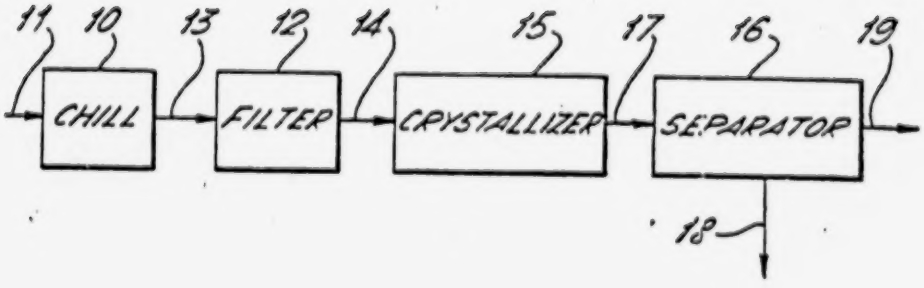
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MAURICE W. GREENSTEIN, *Primary Examiner.*

June 10, 1969 R. G. REIMUS ET AL 3,449,129
CONCENTRATION PROCESS
Original Filed Dec. 2, 1965



United States Patent Office 3,449,129
Patented June 10, 1969

3,449,129

CONCENTRATION PROCESS

Richard G. Reimus and Anthony Saporito, Warren, Pa., assignor, by mesne assignments, to Struthers Patent Corporation, Houston, Tex., a corporation of Texas

Application Apr. 3, 1968, Ser. No. 718,510, which is a division of application Ser. No. 511,173, Dec. 2, 1965, now Patent No. 3,381,302, dated Apr. 30, 1968. Divided and this application Sept. 27, 1968, Ser. No. 763,276

The portion of the term of the patent subsequent to Apr. 30, 1985, has been disclaimed

Int. Cl. A23f 1/08; B01d 1/00

U.S. Cl. 99—71 6 Claims

ABSTRACT OF THE DISCLOSURE

A process is described for the concentration of coffee liquid by partially freezing ice therein and separating the ice from the concentrated liquid. Prior to freezing the ice, the liquid is chilled to a temperature range from about 45° to 80° F. to form a mixture of waxes and similar material and liquid coffee extract and the mixture is treated so that waxes and similar material are removed from the liquid before the ice is formed.

This application is a division of our copending application Ser. No. 718,510 filed Apr. 3, 1968, which is a division of Ser. No. 511,173, now Patent No. 3,381,302.

This invention relates to an improvement in a process for the preparation of concentrated comestible liquids and liquid extracts and is particularly applicable to the preparation of soluble coffee solids or "powdered coffee." More particularly, this invention relates to the pre-treatment of liquids and liquid extracts as a step preliminary to removal of water from the extract by a freezing process.

Soluble, or "powdered," coffee has been prepared by first extracting coffee beans with hot water and subsequently dehydrating the extract by spray drying under vacuum conditions. This process has met with vast commercial success, but the flavor of the soluble coffee leaves much to be desired. The vacuum conditions employed not only remove water from the extract, but also cause volatile taste and flavor elements of the coffee to evaporate. The resulting soluble product is, therefore, never as good as the extract from which it is prepared.

To improve the flavor of the soluble coffee, it has been often proposed to remove substantial amounts of water in the extract by partially freezing the extract and separating the resulting pure ice crystals from the concentrated extract. This process of partial freezing is then followed by a complete dehydration by evaporation of water which may be conducted under vacuum conditions. In this way, the coffee loses less of the volatile components by virtue of the fact that the extract is subject to evaporation conditions for shorter periods of time.

In a preferred embodiment of the freezing process, the coffee extract is partially frozen by indirect refrigeration in a suitable crystallizer and the resulting slurry of ice and concentrate is subjected to centrifugation to separate the ice from the concentrate. In order for the process to be economical, this separation and the subsequent water wash of the crystals on the centrifuge basket must effect a relatively complete removal of mother liquor from the ice crystals.

However, when coffee extract is cooled to near its initial freezing point, a gummy or waxy solid material often precipitates from solution prior to ice formation. This wax or tar is carried along with the ice crystals and coffee extract into the centrifuge and collects on the centrifuge basket, eventually plugging the basket and preventing the complete separation of ice from concentrated extract.

This problem of the precipitation of insoluble materials in the coffee extract is not a problem exclusive to coffee extracts alone, but is also encountered in the preparation of other concentrated extracts of comestible materials. Thus, the process of this invention is also applicable to the preparation of concentrated extracts of such comestible materials as the tea, grape juice, apple juice, beer and orange juice.

It is therefore an object of this invention to provide an improved process for the concentration of comestible liquids and liquid extracts by partial freezing of the liquid or liquid extracts.

Another object of this invention is to provide a process in which a comestible liquid or liquid extract, free of insoluble elements at the freezing temperature of ice, is subjected to freeze concentration.

Yet another object of this invention is to provide an improved process for the concentration of coffee extract by partial freezing of the extract.

Still another object of this invention is to provide a process in which coffee extract, free of insoluble elements at the freezing temperature of ice, is subjected to freeze concentration.

The objects of this invention are accomplished by a process which comprises preparing a comestible liquid or liquid extract, cooling the liquid to precipitate material insoluble at the temperature at which ice forms therein, removing insolubles from the resulting mixture and then subjecting the insoluble-free mixture to concentration by partial freezing of water therefrom.

A preferred embodiment of this invention is a process which comprises extracting coffee beans at elevated temperatures with water to produce a coffee extract, cooling the extract to precipitate materials insoluble at the temperature at which ice forms in the brew, removing insolubles from the resulting mixture and then subjecting the insoluble free mixture to concentration by partial freezing of water therefrom.

The initial steps in the process of preparing instant coffee are the same as preparing regular coffee. Following roasting, the coffee is ground, but the granulation may be extremely coarse and, in some cases, fine particles that may result from grinding are sieved out and used elsewhere.

The grounds are placed in closed containers known as extractors. These extractors are set up in batteries with several extractors to a battery.

Ground coffee and hot water are charged into the first extractor. The coffee is then extracted until the necessary materials have been removed from the grounds. The resulting extract is then charged into the second extractor containing fresh coffee. The second extractor is run until extraction is completed. The resulting coffee extract (which is now stronger than ordinary coffee beverage) is placed in the third extractor containing fresh grounds and the brewing process is again repeated.

In commercial plant operation, the process is conducted in a semi-continuous manner, the fresh water coming into an extraction battery first reaches the extractor having the most spent, exhausted grounds and proceeds from there to the next most spent grounds and so on until, finally, in the last extractor it reaches the fresh, most recently added grounds. This is known as a coutnercurrent extraction system.

Temperature and pressure in the extractor system will vary greatly. Coffee being produced from fresh grounds is usually processed at low temperature with low pressure. Coffee being produced from spent, exhausted grounds is extracted at high temperature and under high pressure.

The coffee extract to be concentrated by freeze concentration can have any coffee solids content from a few percent to as high as 40 to 50 percent. That is, there may be as much as 40 to 50 lbs. of coffee solids in the extract for each 100 lbs. of extract. However, the lower the solids content of extract, the more the water which must be removed during the freeze concentration and drying steps. On the other hand, it has been found that carrying the extraction process to the point where high coffee solids content can be achieved often lowers the flavor quality of the extract. Thus, a preferred range of coffee solids content of the extract for the practice of this invention is from about 10 to 30 percent coffee solids.

In prior art processes, after leaving the extractor system, the coffee extract is clarified of sediment while still at an elevated temperature. One of the most common methods of clarification is by means of a centrifuge in which the coffee liquid is passed through a rapidly rotating cylinder and discharges the clear liquid. Another method is by means of a pressure pump forcing the concentrate through porous paper or cloth.

However, according to one embodiment of the process of this invention, the hot coffee extract is first chilled to near the freezing point so that waxes, tars and gums which are soluble in the hot extract are precipitated therefrom. The cold extract is then subjected to filtration or centrifugation to free it, not only of the precipitated gums, tars and waxes, but also from any sediment resulting from the extraction process.

Because the initial freezing point of the coffee extract is dependent on the total coffee solids content of the extract, the temperature to which the extract should be chilled to precipitate the gums, tars and waxes varies with the exact nature of the extract. Ordinarily, however minimum temperatures of 40° F. and below may be employed in the process of this invention. If it is not desired to form ice in the extract during the precipitation process, the temperature to which the extract is chilled should not be below the initial freezing point. For a coffee extract having 30 wt. percent coffee solids, the temperature is about 27° F.

In practice, it has been found that the tars, waxes and gums will begin to precipitate from coffee at temperatures as high as about 80° F. and that the major portion of insolubles will precipitate at temperatures above 32° F. Thus, an embodiment of this invention comprises chilling the extract to between 80 and 32° F. prior to filtration and freeze concentration. Preferred temperatures for the chilling operation are between about 45 and 32° F. because this temperature range insures virtually complete removal of insolubles.

The coffee extract may be chilled by any convenient means. However, it is preferred to keep the extract under agitation so that the wax and gums formed during the precipitation step do not adhere to the heat transfer surface of the refrigeration means used to precipitate. If desired, the chilled extract may be held at the low temperature for from a few seconds to several or many hours before the waxes, tars and gums are removed, either by centrifugation or filtration. The formation and precipitation of tars, gums and waxes is often time-dependent and

complete precipitation may require holding the material at the low temperature employed until the process is complete. Thus, when conducting the process of this invention in a continuous fashion, the time elapsed between the chilling to precipitate waxes and actual separation of the waxes, tars and gums from the chilled coffee extract will depend on the exact nature of the extract.

In some coffee extracts, continued exposure to low temperature will also cause the formation of a non-waxey particulate precipitate. This particulate precipitate forms after the formation of insoluble tars, waxes and gums and does not interfere with the centrifugal separation of ice from concentrated coffee extract after the freeze concentration process. However, such exposure to low temperatures sufficient to cause this particulate precipitate should be avoided because it is tantamount to degradation of the coffee extract. The resulting concentrated product, after this degradation, is not as satisfactory to the consumer as coffee produced from extract which has been chilled only sufficiently to cause the precipitation of tars, gums and waxes.

Depending upon the exact nature of the coffee blend employed in preparing the extract and the extract itself, from less than 0.5 to about 5 percent by weight of tars, gums and waxes will form during the precipitation step. Although most of the gums, waxes and tars which will form from the coffee extract form at near the initial freezing point of the extract, more may form after the extract is subjected to freeze concentration. Thus, another embodiment of this invention comprises cooling the coffee extract to below the initial freezing temperature to precipitate the insoluble wax, tar or gum and forming a minor amount of ice in the extract. The extract can then be freed of the waxes and tars by filtration, decantation or centrifugation. In this embodiment of the invention, the minor portion of ice formed can be removed along with the waxes and tars, or the extract can be slightly warmed to allow the ice to melt prior to removal of the waxes and tars by filtration, decantation or centrifugation.

The tars, waxes or gums produced by the chilling of the coffee extract can be removed in any convenient fashion as pointed out above. The chilled extract may be held at the chilled temperature until such time as the precipitate settles to the bottom of the container and the precipitate-free portion of the solution can be decanted and then subjected to further processing. Alternatively, the chilled extract may be processed in the same manner as hot coffee extract which is to be freed from sediment. Thus, centrifugation, batch or continuous, or pressure filtration techniques; all well known to the art, may be employed to separate the extract from the precipitate.

After being freed from the precipitate, the resulting precipitate-free coffee extract is then subjected to concentration by partial freezing of the water therefrom. This freeze concentration process can be conducted in batch, semi-continuous or continuous apparatus according to methods known to the art and improvements of the methods. However, any method of removing the water from the coffee extract by crystallization as ice is applicable to the process of this invention. The resulting slurry of ice and concentrated coffee extract is then subjected to centrifugation to free the concentrated solution of the ice crystals. The resuling ice crystals are ordinarily washed with water or dilute coffe extract to free the ice crystals completely of residual mother liquor and the washings may be returned to the freeze concentration process. The practice of this invention has the advantage that the centrifuge basket does not become plugged with precipitated tars and waxes and the separation and washing processes are facilitated in their efficiency.

The freeze concentration of the wax, tar and gum free consuible liquid or extract can be accomplished in either a single stage or in a plurality of stages, each of which comprises a crystallizer in which heat is removed from the coffee extract to form a slurry of ice crystals and

concentrated mother liquor. After each crystallization stage, ice is removed from the slurry and the concentrated extract either goes to further processing in the preparation of soluble or powdered coffee or is further concentrated in a subsequent stage of the freeze concentration process. The crystallization of ice from the extract is preferably carried out in a tubular heat exchanger, the outside surfaces of which are cooled by a circulating refrigerant. The internal section of the tube is ordinarily fitted with a shaft on which is located agitator paddles. Alternatively, a conventional scraped surface tubular heat exchanger may be employed. Any acceptable separating device or centrifuge may be employed for separating the concentrated coffee extract from the resulting ice crystals. This centrifuge is the preferred method for separating ice from the mother liquor and ordinarily consists of a rotating basket which contains perforations for allowing passage of the mother liquor. The centrifuge may also be equipped with some means for washing residual mother liquor from the ice crystals.

Referring now to the drawing accompanying this application, an aqueous comestible extract enters a chilling or cooling apparatus 10 through feed line 11. The chiller may be a conventional refrigeration unit, a continuous tubular heat exchanger or the chilling operation may be conducted in a batch manner by placing containers of extract in a refrigerated room. The chilled extract is then fed to the filter 12 through line 13. The filter apparatus may be a conventional batch filtration unit or, where the precipitated wax or tar can be handled on a centrifuge basket, may comprise a rotating basket centrifuge or ordinary laboratory or batch-type centrifuge. The filtered extract; now free of tars, gums and waxes; is conveyed through line 14 to the tubular crystallizer 15 where the temperature is lowered sufficiently to cause ice to form in the extract. The exact degree of concentration depends upon the cooling medium and temperature on the outside of the crystallizer 12 and the residence time in the crystallizer. Concentrated slurry of ice and mother liquor is then conducted to a separating apparatus 16 through the line 17. The separating apparatus 16 is preferably a rotating basket centrifuge in which the basket is an open screen material which allows concentrated mother liquor to be removed from the outside periphery of the centrifuge through the line 18 while ice, preferably resturried in either water or feed extract, is removed via line 19.

As pointed out above, the crystallizing concentration operation may be conducted in a plurality of stages.

The following examples are illustrative of the process of this invention.

EXAMPLE 1

A batch of coffee extract containing 24 percent coffee solids was pre-cooled to below 40° F. and admitted to a tubular heat exchanger having an internal agitator. The coffee extract was fed to the heat exchanger at the rate of 3 gallons per minute and coffee extract was recirculated around the heat exchanger until ice crystals had formed due to the cooling internally. Recirculation of slurry and mother liquor was continued as coffee extract was fed to the crystallizer, the internals of which were maintained at a temperature of 27° F. A slurry of ice and coffee liquor containing about 30 percent coffee solids was then continuously removed from the crystallizer and fed to a continuous type rotating basket centrifuge. The centrifuge basket was in the form of a perforated screen which allowed coffee liquor to pass through the ice cake, thus separating the ice from the coffee liquor. After 10 minutes of operation, the centrifuge screen plugged with tars and waxes which were precipitated from the coffee extract during the cooling and crystallization process. This caused the operation to stop, due to improper separation of ice and mother liquor.

This procedure is repeated except that the extract is fed to the crystallizer without first pre-chilling. Tars and gums form along with the ice and the centrifuge plugs in the same manner as if the extract had been pre-chilled.

EXAMPLE 2

The general procedure of Example 1 was repeated except that the chilled coffee extract was filtered through fine cheesecloth prior to introduction into the crystallizer. In this filtration process, approximately 1.9 percent of the orignal extract was removed as tars, gums or waxes. The resulting precipitate-free coffee liquor was then admitted to the crystallizer vessel and the slurry produced in the crystallizer was centrifuged continuously. The ice-mother liquor separation was not impeded by plugging of the centrifuge screen with precipitate.

Excellent results are also obtained when coffee liquor to be concentrated is pre-cooled from 80 to 36° F., and when the extract has from 12 to 32 percent coffee solids.

EXAMPLE 3

A tea extract containing 6.8 percent tea solids, at above 80° F. after extraction, is cooled in a heat exchanger to 36° F. The cooled material is then filtered through a filter press and the resulting tar-free extract is freeze concentrated in a tubular crystallizer. The resulting ice-concentrated tea slurry is easily separated on a rotating basket screen-type centrifuge as described above.

The process of this invention is applicable to an aqueous comestible liquid material or liquid extract which is to be concentrated by formation of ice and subsequent removal of ice. Thus, the process of this invention may be used in connection with the freeze concentration of coffee, tea, grape juice, orange juice, beer, vinegar and the like.

Although the invention has been described with reference to particular embodiment thereof, it is to be understood that various changes may be made without departing from the spirit of the invention as defined by the scope of the appended claims.

What is claimed is:

1. In a process for the concentration of liquid coffee extract, which forms insoluble precipitate material at above the temperature at which ice forms therein and which contains therein about 10 to 50% dissolved solids, comprising partial freezing of said liquid extract to form ice and concentrated liquid extract, the improvement which comprises: chilling said liquid extract to a temperature between about 45° and 80° F. to induce formation of insoluble precipitate material therein; holding said liquid extract in said temperature range until after insoluble precipitate material forms; removing said insoluble precipitate material from said liquid extract; subsequently subjecting said liquid extract to reduced temperature to form a mixture of ice and concentrated extract; and separating ice from said concentrated extract.

2. The process according to claim 1 in which the liquid extract is kept under agitation during holding and formation of precipitate.

3. The process according to claim 1 in which the coffee extract to be treated contains about 15% to 30% dissolved solids.

4. A process according to claim 1 in which ice is separated from coffee extract by centrifugation.

5. A process according to claim 1 in which insoluble precipitate is separated from coffee extract by centrifugation.

6. A process for preparing a dehydrated coffee beverage product soluble in water from a liquid coffee extract containing from about 10% to about 50% by weight dissolved solids, some of which form insoluble matter at a temperature above the temperature at which ice forms in the extract, including the steps of:

(a) chilling the extract to a temperature range of from about 80° F. to about 45° F. and maintaining the extract in the temperature range for a period of time

sufficient to precipitate at least a portion of the insoluble matter;

(b) removing the precipitated insoluble matter formed within the range of about 80° F. to about 45° F. from the extract; and

(c) then subjecting the extract to dehydration.

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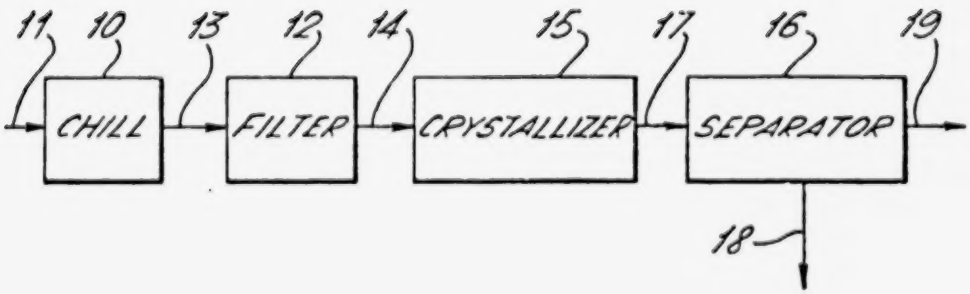
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MAURICE W. GREENSTEIN, *Primary Examiner.*

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[73] Assignee Struthers Scientific and International Corporation

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[54] REMOVAL OF TARS AND WAXES IN FREEZE CONCENTRATION OF COFFEE

12 Claims, 1 Drawing Fig.

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[51] Int. Cl. A23f 1/08, B01d 9/04
[50] Field of Search 99/71, 199, 205; 62/58

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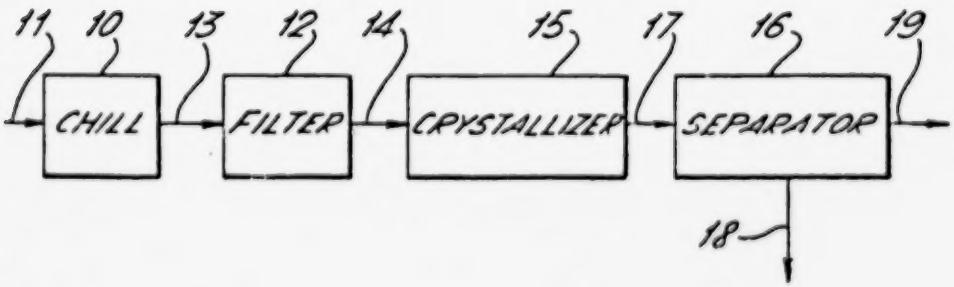
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Primary Examiner—Norman Yudkoff
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ABSTRACT: A process for making coffee concentrates is described in which liquid coffee of high solids concentration is chilled within a temperature range of 80° to 36° F. and precipitates formed within this temperature range are removed prior to freeze concentration by forming slush ice in the coffee, separating the ice from the coffee and then treating the ice so separated to recover residual coffee.



3,632,353

1

REMOVAL OF TARS AND WAXES IN FREEZE CONCENTRATION OF COFFEE

This application is a continuation of Ser. No. 763,217 filed Sept. 27, 1968, now abandoned, which is a division of Ser. No. 718,510 filed Apr. 3, 1968, now US Pat. No. 3,432,308 issued Mar. 11, 1969, which in turn is a division of Ser. No. 511,173 filed Dec. 2, 1965, now U.S. Pat. No. 3,381,302 issued Apr. 30, 1968.

This invention relates to an improvement in a process for the preparation of concentrated comestible liquids and liquid extracts and is particularly applicable to the preparation of soluble coffee solids or "powdered coffee." More particularly, this invention relates to the pretreatment of liquids and liquid extracts as a step preliminary to removal of water from the extract by a freezing process.

Soluble, or "powdered," coffee has been prepared by first extracting coffee beans with hot water and subsequently dehydrating the extract by spray drying under vacuum conditions. This process has met with vast commercial success, but the flavor of the soluble coffee leaves much to be desired. The vacuum conditions employed not only remove water from the extract, but also cause volatile taste and flavor elements of the coffee to evaporate. The resulting soluble product is, therefore, never as good as the extract from which it is prepared.

To improve the flavor of the soluble coffee, it has been often proposed to remove substantial amounts of water in the extract by partially freezing the extract and separating the resulting pure ice crystals from the concentrated extract. This process of partial freezing is then followed by a complete dehydration by evaporation of water which may be conducted under vacuum conditions. In this way, the coffee loses less of the volatile components by virtue of the fact that the extract is subject to evaporation conditions for shorter periods of time.

In a preferred embodiment of the freezing process, the coffee extract is partially frozen by indirect refrigeration in a suitable crystallizer and the resulting slurry of ice and concentrate is subjected to centrifugation to separate the ice from the concentrate. In order for the process to be economical, this separation and the subsequent water wash of the crystals on the centrifuge basket must effect a relatively complete removal of mother liquor from the ice crystals.

However, when coffee extract is cooled to near its initial freezing point, a gummy or waxy solid material often precipitates from solution prior to ice formation. This wax or tar is carried along with the ice crystals and coffee extract into the centrifuge and collects on the centrifuge basket, eventually plugging the basket and preventing the complete separation of ice from concentrated extract.

This problem of the precipitation of insoluble materials in the coffee extract is not a problem exclusive to coffee extracts alone, but is also encountered in the preparation of other concentrated extracts of comestible materials. Thus, the process of this invention is also applicable to the preparation of concentrated extracts of such comestible materials as tea, grape juice, apple juice, beer and orange juice.

It is therefore an object of this invention to provide an improved process for the concentration of comestible liquids and liquid extracts by partial freezing of the liquid or liquid extracts.

Another object of this invention is to provide a process in which a comestible liquid or liquid extract, free of insoluble elements at the freezing temperature of ice, is subjected to freeze concentration.

Yet another object of this invention is to provide an improved process for the concentration of coffee extract by partial freezing of the extract.

Still another object of this invention is to provide a process in which coffee extract, free of insoluble elements at the freezing temperature of ice, is subjected to freeze concentration.

The objects of this invention are accomplished by a process which comprises preparing a comestible liquid or liquid extract, cooling the liquid to precipitate material insoluble at the temperature at which ice forms therein, removing insolubles from the resulting mixture and then subjecting the insoluble-free mixture to concentration by partial freezing of water therefrom.

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A preferred embodiment of this invention is a process which comprises extracting coffee beans at elevated temperatures with water to produce a coffee extract, cooling the extract to precipitate materials insoluble at the temperature at which ice forms in the brew, removing insolubles from the resulting mixture and then subjecting the insoluble-free mixture to concentration by partial freezing of water therefrom.

The initial steps in the process of preparing instant coffee are the same as preparing regular coffee. Following roasting, the coffee is ground, but the granulation may be extremely coarse and, in some cases, fine particles that may result from grinding are sieved out and used elsewhere.

The grounds are placed in closed containers known as extractors. These extractors are set up in batteries with several extractors to a battery.

Ground coffee and hot water are charged into the first extractor. The coffee is then extracted until the necessary materials have been removed from the grounds. The resulting extract is then charged into the second extractor containing fresh coffee. The second extractor is run until extraction is completed. The resulting coffee extract (which is now stronger than ordinary coffee beverage) is placed in the third extractor containing fresh grounds and the brewing process is again repeated.

In commercial plant operation, the process is conducted in a semicontinuous manner, the fresh water coming into an extraction battery first reaches the extractor having the most spent, exhausted grounds and proceeds from there to the next most spent grounds and so on until, finally, in the last extractor it reaches the fresh, most recently added grounds. This is known as a countercurrent extraction system.

Temperature and pressure in the extractor system will vary greatly. Coffee being produced from fresh grounds is usually processed at low temperature with low pressure. Coffee being produced from spent, exhausted grounds is extracted at high temperature and under high pressure.

The coffee extract to be concentrated by freeze concentration can have any coffee solids content from a few percent to as high as 40 to 50 percent. That is, there may be as much as 40 to 50 pounds of coffee solids in the extract for each 100 pounds of extract. However, the lower the solids content of the extract, the more the water which must be removed during the freeze concentration and drying steps. On the other hand, it has been found that carrying the extraction process to the point where high coffee solids content can be achieved often lowers the flavor quality of the extract. Thus, a preferred range of coffee solids content of the extract for the practice of this invention is from about 10 to 30 percent coffee solids.

In prior art processes, after leaving the extractor system, the coffee extract is clarified of sediment while still at an elevated temperature. One of the most common methods of clarification is by means of a centrifuge in which the coffee liquid is passed through a rapidly rotating cylinder and discharges the clear liquid. Another method is by means of a pressure pump forcing the concentrate through porous paper or cloth.

However, according to one embodiment of the process of this invention, the hot coffee extract is first chilled to near the freezing point so that waxes, tars and gums which are soluble in the hot extract are precipitated therefrom. The cold extract is then subjected to filtration or centrifugation to free it, not only of the precipitated gums, tars and waxes, but also from any sediment resulting from the extraction process.

Because the initial freezing point of the coffee extract is dependent on the total coffee solids content of the extract, the temperature to which the extract should be chilled to precipitate the gums, tars and waxes varies with the exact nature of the extract. Ordinarily, however, minimum temperatures of 40° F. and below may be employed in the process of this invention. If it is not desired to form ice in the extract during the precipitation process, the temperature to which the extract is chilled should not be below the initial freezing point.

For a coffee extract having 30 weight percent coffee solids, the temperature is about 27° F.

In practice, it has been found that the tars, waxes and gums will begin to precipitate from coffee at temperatures as high as about 80° F. and that the major portion of insolubles will precipitate at temperatures above 32° F. Thus, an embodiment of this invention comprises chilling the extract to between 80° and 32° F. prior to filtration and freeze concentration. Preferred temperatures for the chilling operation are between about 45° and 32° F. because this temperature range insures virtually complete removal of insolubles.

The coffee extract may be chilled by any convenient means. However, it is preferred to keep the extract under agitation so that the wax and gums formed during the precipitation step do not adhere to the heat transfer surface of the refrigeration means used to precipitate. If desired, the chilled extract may be held at the low temperature for from a few seconds to several or many hours before the waxes, tars and gums are removed, either by centrifugation or filtration. The formation and precipitation of tars, gums and waxes is often time-dependent and complete precipitation may require holding the material at the low temperature employed until the process is complete. Thus, when conducting the process of this invention in a continuous fashion, the time elapsed between the chilling to precipitate waxes and actual separation of the waxes, tars and gums from the chilled coffee extract will depend on the exact nature of the extract.

In some coffee extracts, continued exposure to low temperature will also cause the formation of a nonwaxey particulate precipitate. This particulate precipitate forms after the formation of insoluble tars, waxes and gums and does not interfere with the centrifugal separation of ice from concentrated coffee extract after the freeze concentration process. However, such exposure to low temperatures sufficient to cause this particulate precipitate should be avoided because it is tantamount to degradation of the coffee extract. The resulting concentrated product, after this degradation, is not as satisfactory to the consumer as coffee produced from extract which has been chilled only sufficiently to cause the precipitation of tars, gums and waxes.

Depending upon the exact nature of the coffee blend employed in preparing the extract and the extract itself, from less than 0.5 to about 5 percent by weight of tars, gums and waxes will form during the precipitation step. Although most of the gums, waxes and tars which will form from the coffee extract form at near the initial freezing point of the extract, more may form after the extract is subjected to freeze concentration. Thus, another embodiment of this invention comprises cooling the coffee extract to below the initial freezing temperature to precipitate the insoluble wax, tar or gum and forming a minor amount of ice in the extract. The extract can then be freed of the waxes and tars by filtration, decantation or centrifugation. In this embodiment of the invention, the minor portion of ice formed can be removed along with the waxes and tars, or the extract can be slightly warmed to allow the ice to melt prior to removal of the waxes and tars by filtration, decantation or centrifugation.

The tars, waxes or gums produced by the chilling of the coffee extract can be removed in any convenient fashion as pointed out above. The chilled extract may be held at the chilled temperature until such time as the precipitate settles to the bottom or the container and the precipitate-free portion of the solution can be decanted - - and then subjected to further processing. Alternatively, the chilled extract may be processed in the same manner as hot coffee extract which is to be freed from sediment. Thus, centrifugation, batch or continuous, or pressure filtration techniques; all well known to the art, may be employed to separate the extract from the precipitate.

After being freed from the precipitate, the resulting precipitate-free coffee extract is then subjected to concentration by partial freezing of the water therefrom. This freeze concentration process can be conducted in batch, semicontinuous or continuous apparatus according to methods known to the art and improvements of the methods. However, any method of removing the water from the coffee extract by crystallization as ice is applicable to the process of this invention. The resulting slurry of ice and concentrated coffee extract is then subjected to centrifugation to free the concentrated solution of the ice crystals. The resulting ice crystals are ordinarily washed with water or dilute coffee extract to free the ice crystals completely of residual mother liquor and the washings may be returned to the freeze concentration process. The practice of this invention has the advantage that the centrifuge basket does not become plugged with precipitated tars and waxes and the separation and washing processes are facilitated in their efficiency.

The freeze concentration of the wax, tar and gum free comestible liquid or extract can be accomplished in either a single stage or in a plurality of stages, each of which comprises a crystallizer in which heat is paddles. Alternatively, a conventional scraped surface tubular heat exchanger the coffee extract to form a slurry of ice crystals and concentrated mother liquor. After each crystallization stage, ice is removed from the slurry and the concentrated extract either goes to further processing in the preparation of soluble or powdered coffee or is further concentrated in a subsequent stage of the freeze concentration process. The crystallization of ice from the extract is preferably carried out in a tubular heat exchanger, the outside surfaces of which are cooled by a circulating refrigerant. The internal section of the tube is ordinarily fitted with a shaft on which is located agitator heat exchanger may be employed. Any acceptable separating device or centrifuge may be employed for separating the concentrated coffee extract from the resulting ice crystals. This centrifuge is the preferred method for separating ice from the mother liquor and ordinarily consists of a rotating basket which contains perforations for allowing passage of the mother liquor. The centrifuge may also be equipped with some means for washing residual mother liquor from the ice crystals.

Referring now to the drawing accompanying this application, an aqueous comestible extract enters a chilling or cooling apparatus 10 through feedline 11. The chiller may be a conventional refrigeration unit, a continuous tubular heat exchanger or the chilling operation may be conducted in a batch manner by placing containers of extract in a refrigerated room. The chilled extract is then fed to the filter 12 through line 13. The filter apparatus may be a conventional batch filtration unit or, where the precipitated wax or tar can be handled on a centrifuge basket, may comprise a rotating basket centrifuge or ordinary laboratory or batch-type centrifuge. The filtered extract; now free of tars, gums and waxes; is conveyed through line 14 to the tubular crystallizer 15 where the temperature is lowered sufficiently to cause ice to form in the extract. The exact degree of concentration depends upon the cooling medium and temperature on the outside of the crystallizer 12 and the residence time in the crystallizer. Concentrated slurry of ice and mother liquor is then conducted to a separating apparatus 16 through the line 17. The separating apparatus 16 is preferably a rotating basket centrifuge in which the basket is an open screen material which allows concentrated mother liquor to be removed from the outside periphery of the centrifuge through the line 18 while ice, preferably reslurried in either water or feed extract, is removed via line 19.

As pointed out above, the crystallizing concentration operation may be conducted in a plurality of stages.

The following examples are illustrative of the process of this invention.

EXAMPLE I

A batch of coffee extract containing 24 percent coffee solids were precooled to below 40° F. and admitted to a tubular heat exchanger having an internal agitator. The coffee extract was fed to the heat exchanger at the rate of 3 gallons per

minute and coffee extract was recirculated around the heat exchanger until ice crystals had formed due to the cooling internally. Recirculation of slurry and mother liquor was continued as coffee extract was fed to the crystallizer, the interials of which were maintained at a temperature of 27° F. A slurry of ice and coffee liquor containing about 30 percent coffee solids was then continuously removed from the crystallizer and fed to a continuous-type rotating basket centrifuge. The centrifuge basket was in the form of a perforated screen which allowed coffee liquor to pass through the ice cake, thus separating the ice from the coffee liquor. After 10 minutes of operation, the centrifuge screen plugged with tars and waxes which were precipitated from the coffee extract during the cooling and crystallization process. This caused the operation to stop, due to improper separation of ice and mother liquor.

This procedure is repeated except that the extract is fed to the crystallizer without first prechilling. Tars and gums form along with the ice and the centrifuge plugs in the same manner as if the extract had been prechilled.

EXAMPLE 2

The general procedure of example 1 was repeated except that the chilled coffee extract was filtered through fine cheesecloth prior to introduction into the crystallizer. In this filtration process, approximately 1.9 percent of the original extract was removed as tars, gums or waxes. The resulting precipitate-free coffee liquor was then admitted to the crystallizer vessel and the slurry produced in the crystallizer was centrifuged continuously. The ice mother liquor separation was not impeded by plugging of the centrifuge screen with precipitate.

Excellent results are also obtained when coffee liquor to be concentrated is precooled from 80° to 36° F., and when the extract has from 12 to 32 percent coffee solids.

EXAMPLE 3

A tea extract containing 6.8 percent tea solids, at above 80° F. after extraction, is cooled in a heat exchanger to 36° F. The cooled material is then filtered through a filter press and the resulting tar-free extract is freeze concentrated in a tubular crystallizer. The resulting ice-concentrated tea slurry is easily separated on a rotating basket screen-type centrifuge as described above.

The process of this invention is applicable to any aqueous comestible liquid material or liquid extract which is to be concentrated by formation of ice and subsequent removal of ice. Thus, the process of this invention may be used in connection with the freeze concentration of coffee, tea, grape juice, orange juice, beer, vinegar and the like.

Although the invention has been described with reference to particular embodiments thereof, it is to be understood that various changes may be made without departing from the spirit of the invention as defined by the scope of the appended claims.

We claim:

1. A process of the concentration of a liquid aqueous coffee extract which when chilled produces a precipitate which is insoluble in said extract above the temperature at which ice forms therein, comprising: chilling a feed liquid extract containing 24 percent by weight dissolved solids to a temperature between 80° and 36° F. to form a precipitate therein; holding said liquid extract at a chilled temperature below 80° F until precipitate forms; separating said precipitate and said extract; subsequently concentrating said extract by subjecting said liquid extract to reduced temperature to form a mixture of ice and concentrated liquid extract; separating ice from said concentrated extract; and treating the ice to recover residual coffee solids therefrom.

2. The process according to claim 1 in which the chilled extract is agitated at temperatures between 80° F. and 36° F.

3. A process according to claim 1 wherein the chilled extract is held at a temperature between 36° F. and 45° F.

4. A process according to claim 1 wherein the chilled extract after removal of precipitate is freeze concentrated to remove part of the water present in the extract, as ice, the ice is washed and coffee solids are recovered from the washings.

5. A process as claimed in claim 1 wherein separation of precipitate is effected by filtration above 36° F.

6. A process as claimed in claim 1 wherein separation of precipitate is effected by centrifugation above 36° F.

7. A process as claimed in claim 1 wherein the precipitate free liquid extract is concentrated in a single-stage crystallizing process.

8. A process as claimed in claim 1 wherein the precipitate free liquid extract is concentrated in a multistage crystallizing process.

9. A process as claimed in claim 1 wherein the precipitate free liquid extract is concentrated in a tubular scraped surface heat exchanger.

10. A process as claimed in claim 1 wherein ice is separated from the liquid in a centrifuge and the ice is washed while in the centrifuge.

11. A process as claimed in claim 10 wherein washing liquid is treated to recover coffee content therefrom after washing the ice.

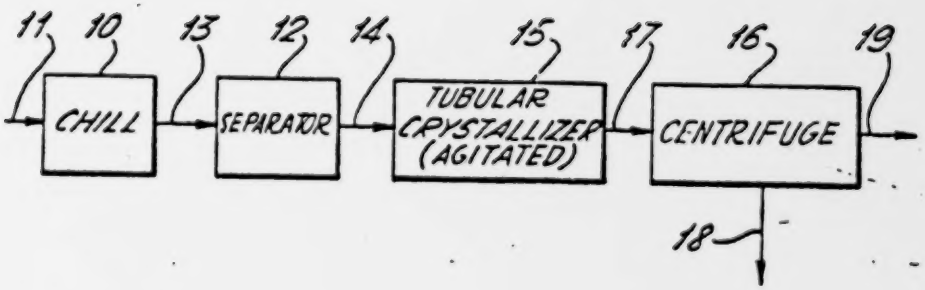
12. A process as claimed in claim 1 in which the extract is agitated while forming a mixture of ice and concentrated extract.

* * * * *

Oct. 28, 1969 R. G. REIMUS ET AL 3,474,723

BEVERAGE APPARATUS

Original Filed Dec. 2, 1965



United States Patent Office 3,474,723 Patented Oct. 28, 1969

3,474,723

BEVERAGE APPARATUS

Richard G. Reimus and Anthony Saporito, Warren, Pa., assignors to Struthers Scientific and International Corporation

Application Apr. 3, 1968, Ser. No. 718,510, now Patent No. 3,432,308, dated Mar. 11, 1969, which is a division of application Ser. No. 511,173, Dec. 2, 1965, now Patent No. 3,381,302, dated Apr. 30, 1968. Divided and this application Sept. 30, 1968, Ser. No. 763,851

Int. Cl. A23f 1/08; B01d 9/04

U.S. Cl. 99—236

5 Claims

ABSTRACT OF THE DISCLOSURE

A system of apparatus for removing water from coffee and tea extract by first chilling to form a suspension of solids in the liquid is provided which removes the solids from the liquid and thereafter forms a mixture of ice and liquid. The ice is separated in a centrifuge and is washed. Apparatus for removing the solids before forming ice prevents plugging of the centrifuge.

This application is a division of copending application Ser. No. 718,510, filed Apr. 3, 1968, now Patent No. 3,432,308 issued Mar. 11, 1969, which is a division of Ser. No. 511,173, now Patent No. 3,381,302 issued Apr. 30, 1968.

This invention relates to apparatus for the preparation of concentrated comestible liquids and liquid extracts and is particularly applicable to equipment for making soluble tea and coffee solids or "powdered coffee." More particularly, this invention relates to systems of equipment for use in the pretreatment of liquids and liquid extracts in a step preliminary to removal from the extract by a freezing process.

Soluble, or "powdered," coffee has been prepared by first extracting coffee beans with hot water and subsequently dehydrating the extract by spray drying under vacuum conditions. This process has met with vast commercial success, but the flavour of the soluble coffee leaves much to be desired. The vacuum conditions employed not only remove water from the extract, but also cause volatile taste and flavour elements of the coffee to evaporate. The resulting soluble product is, therefore, never as good as the extract from which it is prepared.

To improve the flavour of the soluble coffee, it has been often proposed to remove substantial amounts of water in the extract by partially freezing the extract and separating the resulting pure ice crystals from the concentrated extract. This process of partial freezing is then followed by a complete dehydration by evaporation of water which may be conducted under vacuum conditions. In this way, the coffee loses less of the volatile components by virtue of the fact that the extract is subject to evaporation conditions for shorter periods of time.

In a preferred embodiment of the freezing process, the coffee extract is partially frozen by indirect refrigeration in a suitable crystallizer and the resulting slurry of ice and concentrate is subjected to centrifugation to separate the ice from the concentrate. In order for the process to be economical, this separation and the subsequent water wash of the crystals on the centrifuge basket must effect a relatively complete removal of mother liquor from the ice crystals.

However, when coffee extract is cooled to near its initial freezing point, a gummy or waxy solid material often precipitates from solution prior to ice formation. This wax or tar is carried along with the ice crystals and coffee extract into the centrifuge and collects on the centrifuge

basket, eventually plugging the basket and preventing the complete separation of ice from concentrated extract.

This problem of the precipitation of insoluble materials in the coffee extract is not a problem exclusive to coffee extracts alone, but is also encountered in the preparation of other concentrated extracts of comestible materials. Thus, the apparatus of this invention is also applicable to the preparation of concentrated extracts of such comestible materials as tea, grape juice, apple juice, beer and orange juice.

According to this invention an apparatus for concentration of comestible liquids comprising a precooling device, a precipitate separation device, and a freeze concentration device are connected together in that order to form a system.

The initial steps in the process of preparing instant coffee are the same as preparing regular coffee. Following roasting, the coffee is ground, but the granulation may be extremely coarse and, in some cases, fine particles that may result from grinding are sieved out and used elsewhere.

The grounds are placed in closed containers known as extractors. These extractors are set up in batteries with several extractors to a battery.

Ground coffee and hot water are charged into the first extractor. The coffee is then extracted until the necessary materials have been removed from the grounds. The resulting extract is then charged in the second extractor containing fresh coffee. The second extractor is run until extraction is completed. The resulting coffee extract (which is now stronger than ordinary coffee beverage) is placed in the third extractor containing fresh grounds and the brewing process is again repeated.

In commercial plant operation, the process is conducted in a semi-continuous manner, the fresh water coming into an extraction battery first reaches the extractor having the most spent, exhausted grounds and proceeds from there to the next most spent grounds and so on until, finally, in the last extractor it reaches the fresh, most recently added grounds. This is known as a counter-current extraction system.

Temperature and pressure in the extractor system will vary greatly. Coffee being produced from fresh grounds is usually processed at low temperature with low pressure. Coffee being produced from spent, exhausted grounds is extracted at high temperature and under high pressure.

In prior art processes, after leaving the extractor system, the coffee extract is clarified of sediment while still at an elevated temperature. One of the most common methods of clarification is by means of a centrifuge in which the coffee liquid is passed through a rapidly rotating cylinder and discharges the clear liquid. Another method is by means of a pressure pump forcing the concentrate through porous paper or cloth.

However, according to one embodiment of this invention, the hot coffee extract is first chilled to near the freezing point so that waxes, tars, and gums which are soluble in the hot extract are precipitated therefrom. The cold extract is then subjected to filtration or centrifugation to free it, not only of the precipitated gums, tars and waxes, but also from any sediment resulting from the extraction process.

Because the initial freezing point of the coffee extract is dependent on the total coffee solids content of the extract, the temperature to which the extra should be chilled to precipitate the gums, tars and waxes varies with the exact nature of the extract. Ordinarily, however, temperatures of 80° F. to 40° F. may be employed in this invention. If it is not desired to form ice in the extract during the precipitation process, the temperature to which the extract is chilled should not be below the initial freezing point. For

a coffee extract having 30 wt. percent coffee solids, the temperature is about 27° F.

The coffee extract may be chilled by any convenient means. However, it is preferred to keep the extract under agitation so that the wax and gums formed during the precipitation step do not adhere to the heat transfer surface of the refrigeration means used to precipitate. If desired, the chilled extract may be held at the low temperature for from a few seconds to several or many hours before the waxes, tars and gums are removed, either by centrifugation or filtration. The formation and precipitation of tars, gums and waxes is often time-dependent and complete precipitation may require holding the material at the low temperature employed until the process is complete. Thus, when this invention in a continuous fashion, the time elapsed between the chilling to precipitate waxes and actual separation of the waxes, tars and gums from the chilled coffee extract will depend on the exact nature of the extract.

In some coffee extracts, continued exposure to low temperature will also cause the formation of a non-waxy particulate precipitate. This particulate precipitate forms after the formation of insoluble tars, waxes and gums and does not interfere with the centrifugal separation of ice from concentrated coffee extract after the freeze concentration process. However, such exposure to low temperatures sufficient to cause this particulate precipitate should be avoided because it is tantamount to degradation of the coffee extract. The resulting concentrated product, after this degradation, is not as satisfactory to the consumer as coffee produced from extract which has been chilled only sufficiently to cause the precipitation of tars, gums and waxes.

Depending upon the exact nature of the coffee blend employed in preparing the extract and the extract itself, from less than 0.5 to about 5 percent by weight of tars, gums and waxes will form during the precipitation step. Although most of the gums, waxes and tars which will form from the coffee extract form at near the initial freezing point of the extract, more may form after the extract is subjected to freeze concentration. Thus, the coffee extract may be cooled to below the initial freezing temperature to precipitate the insoluble wax, tar or gum and forming a minor amount of ice in the extract. The extract can then be freed of the waxes and tars by filtration, decantation or centrifugation. The minor portion of ice formed can be removed along with the waxes and tars, or the extract can be slightly warmed to allow the ice to melt prior to removal of the waxes and tars by filtration, decantation or centrifugation.

The tars, waxes or gums produced by the chilling of the coffee extract can be removed as pointed out above. The chilled extract may be held at the chilled temperature until such time as the precipitate settles to the bottom of the container and the precipitate-free portion of the solution can be decanted and then subjected to further processing. Alternatively, the chilled extract may be processed in the same manner as hot coffee extract which is to be freed from sediment. Thus, centrifugation, batch or continuous, or pressure filtration techniques; all well known to the art, may be employed to separate the extract from the precipitate.

After being freed from the precipitate, the resulting precipitate-free coffee extract is then subjected to concentration by partial freezing of the water therefrom. This freeze concentration process can be conducted in batch, semi-continuous or continuous apparatus according to methods known to the art and improvements of the methods. However, any method of removing the water from the coffee extract by crystallization as ice is applicable to the process of this invention. The resulting slurry of ice and concentrated coffee extract is then subjected to centrifugation to free the concentrated solution of the ice crystals. The resulting ice crystals are ordinarily washed with water or dilute coffee extract to free the ice crystals completely of residual mother liquor and the washings may be returned to the freeze concentration process. The practice of this invention has the advantage that the centrifuge basket does not become plugged with precipitated tars and waxes and the separation and washing processes are facilitated in their efficiency.

The freeze concentration of the wax, tar and gum free comestible liquid or extract can be accomplished in either a single stage or in a plurality of stages, each of which comprises a crystallizer in which heat is removed from the coffee extract to form a slurry of ice crystals and concentrated mother liquor. After each crystallization stage, ice is removed from the slurry and the concentrated extract either goes to further processing in the preparation of soluble of powdered coffee or is further concentrated in a subsequent stage of the freeze concentration process. The crystallization of ice from the extract is preferably carried out in a tubular heat exchanger, the outside surfaces of which are cooled by a circulating refrigerant. The internal section of the tube is ordinarily fitted with a shaft on which is located agitator paddles. Alternatively, a conventional scraped surface tubular heat exchanger may be employed. Any acceptable separating device or centrifuge may be employed for separating the concentrated coffee extract from the resulting ice crystals. This centrifuge is the preferred method for separating ice from the mother liquor and ordinarily consists of a rotating basket which contains perforations for allowing passage of the mother liquor. The centrifuge may also be equipped with means for washing residual mother liquor from the ice crystals.

Referring now to the drawing accompanying this application, an aqueous comestible extract enters a chilling or cooling apparatus 10 through feed line 11. The chiller may be a conventional refrigeration unit, a continuous tubular heat exchanger or the chilling operation may be conducted in a batch manner by placing containers of extract in a refrigerated room. The chilled extract is then fed to the separator filter 12 through line 13. The separator filter apparatus may be a conventional batch filtration unit or, where the precipitated wax or tar can be handled on a centrifuge basket, may comprise a rotating basket centrifuge or ordinary laboratory or batch-type centrifuge. The separated extract; now free of tars, gums and waxes; is conveyed through line 14 to the tubular crystallizer 15 where the temperature is lowered sufficiently to cause ice to form in the extract. The exact degree of concentration depends upon the cooling medium and temperature on the outside of the crystallizer 15 and the residence time in the crystallizer. Concentrated slurry of ice and mother liquor is then conducted to a centrifuge separating apparatus 16 through the line 17. The centrifuge separating apparatus 16 is preferably a rotating basket centrifuge in which the basket is an open screen material which allows concentrated mother liquor to be removed from the outside periphery of the centrifuge through the line 18 while ice, preferably reslurried in either water or feed extract, is removed via line 19.

As pointed out above, the crystallizing concentration operation may be conducted in a plurality of stages.

What we claim is:

1. An apparatus system for concentration of aqueous liquid coffee or tea extract comprising: precooling and holding means, a precipitate separation device, a first line conducting cooled extract from said precooling and holding means to said separation device, a tubular ice crystallizer, a second line conducting separated extract from said separation device to said tubular ice crystallizer, a centrifuge ice separator, a third line conducting a slurry of ice in a concentrated liquid extract to said centrifuge ice separator from said crystallizer, a fourth line conducting concentrated extract from said centrifuge ice separator, means removing ice from said centrifuge ice separator, and means for washing said ice.

2. An apparatus system according to claim 1 including means agitating said extract in said precooling and holding means.

3. An apparatus system according to claim 1 in which means are provided for washing said ice in said centrifuge.

4. An apparatus system according to claim 1 including means in said tubular ice crystallizer agitating said extract.

5. An apparatus system according to claim 1 in which said ice crystallizer is a scraped surface crystallizer.

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ROBERT W. JENKINS, Primary Examiner

U.S. Cl. X.R.

99—71, 77

United States Patent Office 3,404,007 Patented Oct. 1, 1968

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,404,007 October 1, 1968

John G. Muller

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 6, line 3, for "-50° C." read -- -45° C. --.

Signed and sealed this 4th day of February 1969.

(SEAL)
Attest:

Edward M. Fletcher, Jr.
Attesting Officer

EDWARD J. BRENNER
Commissioner of Patents

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,404,007 October 1, 1968

John G. Muller

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 4, line 20, "250" should read -- .250 --; line 21, "200" should read -- .200 --; line 67, "250" should read -- .250 --.

Signed and sealed this 26th day of August 1969.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents

United States Patent Office

3,404,007
Patented Oct. 1, 1968

3,404,007

FREEZE DRIED COFFEE PROCESS AND PRODUCT

John G. Muller, Scarsdale, N.Y., assignor to Struthers Scientific and International Corporation, a corporation of Delaware

No Drawing. Filed Jan. 22, 1964, Ser. No. 323,574
5 Claims. (Cl. 99—71)

ABSTRACT OF THE DISCLOSURE

A process is provided for making concentrated coffee or tea in dry form by freeze concentration of an aqueous beverage extract in which solids are recovered from the ice crystals and the concentrated extract is freeze dried.

This invention relates to an improved process for the preparation of powdered soluble food products and is particularly applicable to the preparation of powdered or soluble coffee and tea.

Soluble or "powdered" coffee has been prepared by first extracting coffee beans with hot water and subsequently dehydrating the extract by spray drying under either vacuum, or slightly elevated pressure conditions. This process has met with vast commercial success, but the flavor of the soluble coffee leaves much to be desired. Volatile taste and flavor elements of the coffee are lost through evaporation, and more oxidation takes place also because of the elevated temperatures and pressure of air. The resulting soluble product is, therefore, never as good as the extract from which it is prepared.

To improve the flavor of the soluble coffee, it has been often proposed to remove substantial amounts of the water in the extract by partially freezing the extract and separating the resulting pure ice crystals from the concentrated extract. This process of partial freezing is then followed by a complete dehydration under vacuum conditions. In this way the coffee loses less of the volatile components by virtue of the fact that the extract is subject to vacuum conditions for shorter periods of time.

The conventional method for complete dehydration of the coffee product is by means of spraying the concentrated extract at high temperature into a tower to flash off all remaining water so that final product is a soluble powder. Unfortunately, during this flash evaporation process which is known as spray drying, much of the flavor components of the coffee which are volatile flash off along with the water and must somehow be replaced in the coffee powder. Even this replacement of the coffee aroma elements into the coffee powder produces a product which is not truly comparable to freshly brewed coffee.

Similarly, soluble powdered tea has been prepared by first brewing tea extract and then completely dehydrating the extract. As with powdered coffee, the soluble tea product leaves much to be desired in terms of its flavor.

It is therefore an object of this invention to provide an improved process for the preparation of soluble coffee and tea products. Another object of this invention is the preparation of powdered concentrate materials which may be reconstituted in water.

The objects of this invention are accomplished by a process for the preparation of a dehydrated beverage product, including soluble coffee and soluble tea, the process comprising preparing an extract of the beverage from a vegetable product containing extractable flavor, subjecting the extract to concentration by partial freezing to form ice crystals and a more concentrated extract, separating the more concentrated extract from the ice crystals and subjecting the more concentrated extract to relatively complete dehydration by freeze drying.

When applied to the preparation of soluble coffee, the process comprises preparing a coffee extract by extracting coffee grounds with water, subjecting the extract to concentration by partial freezing to form ice crystals and a concentrated coffee extract, separating the concentrated extract from the ice crystals and subjecting the concentrated extract to complete dehydration by freezing the concentrated extract to a solid mass and subjecting the thus frozen extract to dehydration under low temperatures and reduced pressure.

The initial steps in the process of preparing instant coffee are the same as preparing regular coffee. Following roasting, the coffee is ground, but the granulation may be extremely coarse, and, in some cases, fine particles that may result from grinding are sieved out and used elsewhere.

The grounds are placed in closed containers known as extractors. These extractors are set up in batteries with several extractors to a battery.

Ground coffee and hot water are charged into the first extractor. The coffee is then extracted until the necessary materials have been removed from the grounds. The resulting extract is then charged into the second extractor containing fresh coffee. The second extractor is run until extraction is completed. The resulting coffee extract (which is now stronger than ordinary coffee beverage) is placed in the third extractor containing fresh grounds and the brewing process is again repeated.

In commercial plant operation, the process is conducted in a semi-continuous manner, the fresh water coming into an extraction battery first reaches the exterior having the most spent, exhausted grounds and proceeds from there to the next most spent grounds and so on until, finally, in the last extractor it reaches the fresh, most recently added grounds. This is known as a countercurrent extraction system.

Temperature and pressure in the extractor system will vary greatly. Coffee being produced from fresh grounds is usually processed at low temperature with low pressure. Coffee being produced from spent, exhausted grounds is extracted at high temperature and under high pressure.

The coffee extract to be concentrated by freeze concentration can have any coffee solids content from a few percent (such as from about 3 to 10 percent) to as high as 40 to 50 percent. That is, there may be as much as 40 to 50 lbs. of coffee solids in the extract for each 100 lbs. of extract. However, the lower the solids content of the extract, the more the water which must be removed during the freeze concentration and drying steps. On the other hand, it has been found that carrying the extraction process to the point where high coffee solids content can be achieved often lowers the flavor quality of the extract. Thus, a preferred range of coffee solids content of the extract before freeze concentration for the practice of this invention is from about 10 to 30 percent coffee solids.

In prior art processes, after leaving the extractor system the coffee extract is clarified of sediment while still at an elevated temperature. One of the most common methods of clarification is by means of a centrifuge in which the coffee liquid is passed through a rapidly rotating cylinder and discharges the clear liquid. Another method is by means of a pressure pump forcing the concentrate through porous paper or cloth.

Various methods of preparing coffee extracts which may be employed in the process of this invention are described in Sivetz and Foote, "Coffee Processing Technology," volume 1, pages 261 through 319 and volume 2, pages 213 through 246, published by the AVI Publishing Company, Inc., Westport, Conn., in 1963. In addition, process and equipment described in the following U.S.

patents can be employed in preparing coffee extracts useful in the process of this invention: 2,340,758; 2,410,157; 2,515,730; 2,913,399; 2,915,403; 2,629,663; 2,783,149; 2,437,768.

After being freed from the sediment the resulting coffee extract is then subjected to concentration by partial freezing of the water therefrom. This freeze concentration process can be conducted in batch semi-continuous or continuous apparatus according to methods known to the art and improvements of the methods. However, any method of removing the water from the coffee extract by crystallization as ice is applicable to the process of this invention. The resulting slurry of ice and concentrated coffee extract is then subjected to centrifugation to free the concentrated solution of the ice crystals. The resulting ice crystals are ordinarily washed with water or dilute coffee extract to free the ice crystals completely of residual mother liquor and the washings may be returned to the freeze concentration process or to the extractors or to existing spray dryers.

The freeze concentration of the extract can be accomplished in either a single stage or in a plurality of stages each of which comprises a crystallizer in which heat is removed from the coffee extract to form a slurry of ice crystals and concentrated mother liquor. After each crystallization stage, ice is removed from the slurry and the concentrated extract either goes to further processing in the preparation of soluble or powdered coffee or is further concentrated in a subsequent stage of the freeze concentration process. The crystallization of ice from the extract is preferably carried out in a tubular heat exchanger, the outside surfaces of which are cooled by a circulating refrigerant. The internal section of the tube is ordinarily fitted with a shaft on which is located agitator paddles. Alternatively, a conventional scraped surface tubular heat exchanger may be employed. Any acceptable separating device or centrifuge may be employed for separating the concentrated coffee extract from the resulting ice crystals. This centrifuge is the preferred method for separating ice from the mother liquor and ordinarily consists of a rotating basket which contains perforations for allowing passage of the mother liquor. The centrifuge may also be equipped with some means for washing residual mother liquor from the ice crystals.

After concentration by partial freezing and separation of the resulting ice crystals, and prior to relatively complete dehydration by freeze drying, the concentrated coffee extract may contain from less than 30 to about 50 percent or more by weight of coffee solids. To reduce the water removal requirements of the freeze drying step, it is preferred that the effluent from the concentration by partial freezing contain as high as possible a percentage of coffee solids. However, the higher the percentage of coffee solids, the more viscous is the coffee liquor and the more difficult it is to separate efficiently from the ice crystals. Thus, a preferred embodiment of this invention comprises partially concentrated coffee extract having up to about 50 percent coffee solids prior to relatively complete dehydration by freeze drying.

Processes for concentration of the extract by a freezing process are described in vol. 2, pages 14 through 21 of Sivetz, Coffee Processing Technology, (The AVI Publishing Co., 1963). In addition, various processes for freeze concentration are described in the following U.S. patents: 2,977,234, 2,967,778, 2,888,353, 2,887,851, 2,862,824, 2,854,494, 2,851,368, 2,815,288, 2,800,001, 2,764,880, 2,764,488, 2,735,779, 2,734,355, 2,676,469, 2,657,551, 2,657,549, 2,559,204, 2,552,525, 2,552,523, 2,503,695.

After the coffee extract has been concentrated by partial freezing and separation of the resulting ice crystals, it is dehydrated to powder form by a method known in the art as freeze drying. According to this method, the coffee extract is frozen to a low temperature and subjected to vacuum conditions so that the ice sublimes away from the mass, leaving only the coffee solids containing but a small amount of water. During the vacuum sublimation of the ice, heat must be supplied to maintain the temperature at the particular level required to maintain the process at the vacuum conditions selected. Processes for freeze drying coffee extract are described in Van Arsdel, Food Dehydration, I, Principles, and Copely and Van Arsdel, Food Dehydration II, Products and Technology, both published by the AVI Publishing Company, Inc., Westport, Connecticut, 1963 and 1964 respectively. In addition, freeze drying processes and equipment are described in U.S. Patents: 2,620,573, 2,292,447, 3,132,929, 2,445,120, 1,979,124, 2,414,940, 2,302,253, 2,731,734, 2,994,132, 3,078,586, 3,132,930, 3,146,077, 3,178,829, 3,192,643, 3,199,217, 3,174,229, 2,353,986, 2,731,687, 2,411,192, 2,225,627, 2,374,232, 2,616,604, 2,930,139, 3,013,341, 3,088,222, 3,135,589, 3,176,408, 3,184,862, 3,192,645. To accomplish this freeze drying, the coffee solids are generally frozen to a temperature between —40° F. and —30° F. and subjected to pressures ranging from 250 mm. of Hg to 200 mm. of Hg. Depending upon the condition employed, residence times in the batch freeze drying apparatus vary from less than 4 to 10 hours, or longer. Where continuous freeze drying is employed, then residence time will be as long as 20 hours, or longer.

Coffee solids are generally dehydrated in this process to have between about 1 and 5 percent residual water. Therefore, as used throughout this specification, the term completely dehydrated coffee solids refers to the dehydrated coffee product prepared by freeze drying which contains from 1 to 5 percent moisture.

The soluble powdered coffee product prepared by the process of this invention has many advantages over the powdered material prepared by prior art processes. By following the process of this invention, the powdered coffee product has a flavor and aroma much more closely resembling that of freshly brewed coffee. This is because freeze concentration, combined with freeze drying, operates under such conditions whereby a minimum of the volatile coffee flavor and aroma elements are removed during processing. Furthermore, the soluble coffee product produced by the process of this invention may have a higher bulk density than soluble coffee products produced by prior art processes and, in addition, is more readily soluble in cold water than are prior art products and is darker in color.

EXAMPLE 1

Ground coffee and water are charged to a countercurrent extractor and extracted to result in an extract containing 24 percent soluble coffee solids. This extract was continuously metered into a crystallizer wherein 10 pounds per minute of water formed individual ice crystals to result in a slurry of concentrated coffee, having 32 percent soluble coffee solids and ice. This slurry was conveyed to a centrifuge having a basket rotating at 2200 revolutions per minute and a wash water rate of 4 pounds of fresh water per minute. The concentrated solution of coffee was discharged through the perforated rotating basket as product at the rate of 30 pounds per minute and contained 32 percent soluble coffee solids.

This solution is then poured onto trays and frozen at a temperature of —40° F. Then the trays are inserted into a freeze-drying apparatus. There, the ice in the frozen mass is sublimed as the pressure is reduced. The final pressure vacuum is 250 mm. Heating is applied to the shelfs on a programmed basis, with temperature ranging from 250°F. at the beginning of the cycle to 90°F. at its conclusion. Duration of the cycle is approximately 8 hours. The resulting dry coffee product has about three percent moisture and is readily soluble in water. It has a flavor preferable to soluble coffee prepared by other methods.

EXAMPLE 2

A tea extract containing 6.8 percent tea solids, at above 80°F. after extraction, is cooled in a heat exchanger to 36°F. The cooled material is then freeze concentrated in a tubular crystallizer. The resulting ice-concentrated tea slurry is then separated on a rotating basket screen-type centrifuge and frozen solid, then freeze dried to 3 percent moisture to give a superior soluble tea product.

Although the invention has been described with reference to particular embodiments thereof, it is to be understood that various changes may be made without departing from the spirit of the invention as defined by the scope of the appended claims.

I claim:

1. A process for the preparation of a dehydrated coffee beverage product which is readily soluble in cold water, said process comprising:

(a) preparing an aqueous coffee extract containing about 10 to 30 percent by weight of dissolved solids;

(b) subjecting said extract to concentration by partial freezing to form ice crystals and a more concentrated extract containing about 30 to about 50 percent by weight of solids;

(c) separating said more concentrated extract from said ice crystals by centrifugation; and

(d) subjecting said more concentrated extract to relatively complete dehydration by freezing the extract

to a solid mass and freeze drying to a moisture content of about 1 to 5 percent at temperatures between about 0° to −50° C.

2. The process according to claim 1 in which the ice is washed in step (c) and the washings are returned to step (b).

3. The process according to claim 1 in which the ice is washed in step (c) and the washings are returned to step (a).

4. The process according to claim 1 in which the ice is washed in step (c) and thereafter the washings are spray dried.

5. The product produced by the process of claim 1.

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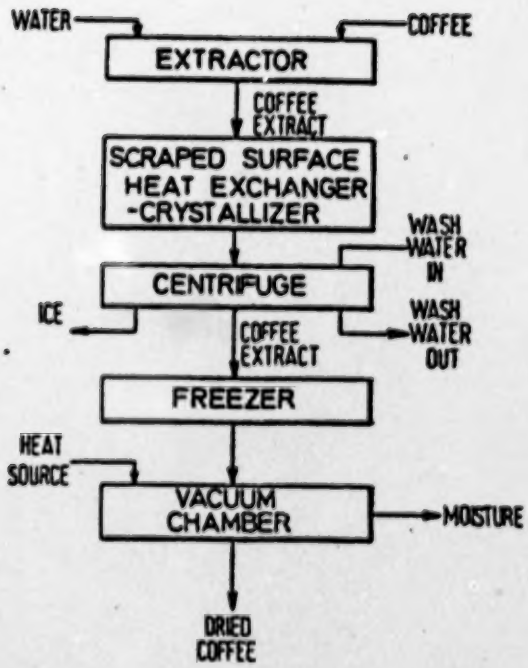
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A-720

Feb. 17, 1970 J. G. MULLER 3,495,522

BEVERAGE APPARATUS

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1

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BEVERAGE APPARATUS

John George Muller, McLean, Va., assignor to Struthers Scientific and International Corporation, a corporation of Delaware

Application June 21, 1968, Ser. No. 738,776, which is a division of application Ser. No. 523,574, Jan. 28, 1966. Divided and this application June 2, 1969, Ser. No. 829,613

Int. Cl. A23f 1/08

U.S. Cl. 99—236 3 Claims

ABSTRACT OF THE DISCLOSURE

A system of apparatus for dehydrating coffee and tea is disclosed in which a freeze concentration device includes an integral agitator device and an ice separating centrifuge which is connected to a freeze drying device which removes moisture from the freeze concentrated product under vacuum by sublimation and heat.

The present application is a division of my copending application Ser. No. 738,776, filed June 21, 1968, which in turn is a division of Ser. No. 523,574, filed January 28, 1966, now U.S. Patent No. 3,404,007.

The drawing shows schematically the preferred connecting and arrangement of the system of apparatus according to the invention.

This invention relates to an improved process for the preparation of powdered soluble food products and is particularly applicable to the preparation of powdered or soluble coffee and tea.

Soluble or "powdered" coffee has been prepared by first extracting coffee beans with hot water and subsequently dehydrating the extract by spray drying under either vacuum or slightly elevated pressure conditions. This process has met with vast commercial success, but the flavor of the soluble coffee leaves much to be desired. Volatile taste and flavor elements of the coffee are lost through evaporation, and more oxidation takes place also because of the elevated temperatures and pressure of air. The resulting soluble product is, therefore, never as good as the extract from which it is prepared.

To improve the flavor of the soluble coffee, it has been often proposed to remove substantial amounts of the water in the extract by partially freezing the extract and separating the resulting pure ice crystals from the concentrated extract. This process of partial freezing is then followed by a complete dehydration under vacuum conditions. In this way the coffee loses less of the volatile components by virtue of the fact that the extract is subject to vacuum conditions for shorter periods of time.

The conventional method for complete dehydration of the coffee product is by means of spraying the concentrated extract at high temperature into a tower to flash off all remaining water so that the final product is a soluble powder. Unfortunately, during this flash evaporation process which is known as spray drying, much of the flavor components of the coffee which are volatile flash off along with the water and must somehow be replaced in the coffee powder. Even this replacement of the coffee aroma elements into the coffee powder produces a product which is not truly comparable to freshly brewed coffee.

Similarly, soluble powdered tea has been prepared by first brewing tea extract and then completely dehydrating the extract. As with powdered coffee, the soluble tea product leaves much to be desired in terms of its flavor.

It is therefore an object of this invention to provide an improved process for the preparation of soluble coffee and tea products. Another object of this invention is the

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preparation of powdered comestible materials which may be reconstituted in water.

The objects of this invention are accomplished by a process for the preparation of a dehydrated beverage product, including soluble coffee and soluble tea, the process comprising preparing an extract of the beverage from a vegetable product containing extractable flavor, subjecting the extract to concentration by partial freezing to form ice crystals and a more concentrated extract, separating the more concentrated extract from the ice crystals and subjecting the more concentrated extract to relatively complete dehydration by freeze drying.

When applied to the preparation of soluble coffee, the process comprises preparing a coffee extract by extracting coffee grounds with water, subjecting the extract to concentration by partial freezing to form ice crystals and a concentrated coffee extract, separating the concentrated extract from the ice crystals and subjecting the concentrated extract to complete dehydration by freezing the concentrated extract to a solid mass and subjecting the thus frozen extract to dehydration under low temperatures and reduced pressure.

The initial steps in the process of preparing instant coffee are the same as preparing regular coffee. Following roasting, the coffee is ground, but the granulation may be extremely coarse, and, in some cases, fine particles that may result from grinding are sieved out and used elsewhere.

The grounds are placed in closed containers known as extractors. These extractors are set up in batteries with several extractors to a battery.

Ground coffee and hot water are charged into the first extractor. The coffee is then extracted until the necessary materials have been removed from the grounds. The resulting extract is then charged into the second extractor containing fresh coffee. The second extractor is run until extraction is completed. The resulting coffee extract (which is now stronger than ordinary coffee beverage) is placed in the third extractor containing fresh grounds and the brewing process is again repeated.

In commercial plant operation, the process is conducted in a semi-continuous manner, the fresh water coming into an extraction battery first reaches the extractor having the most spent, exhausted grounds and proceeds from there to the next most spent grounds and so on until, finally, in the last extractor it reaches the fresh, most recently added grounds. This is known as a countercurrent extraction system.

Temperature and pressure in the extractor system will vary greatly. Coffee being produced from fresh grounds is usually processed at low temperature with low pressure. Coffee being produced from spent, exhausted grounds is extracted at high temperature and under high pressure.

The coffee extract to be concentrated by freeze concentration can have any coffee solids content from a few percent (such as from about 3 to 10 percent) to as high as 40 to 50 percent. That is, there may be as much as 40 to 50 lbs. of coffee solids in the extract for each 100 lbs. of extract. However, the lower the solids content of the extract, the more the water which must be removed during the freeze concentration and drying steps. On the other hand, it has been found that carrying the extraction process to the point where high coffee solids content can be achieved often lowers the flavor quality of the extract. Thus, a preferred range of coffee solids content of the extract before freeze concentration for the practice of this invention is from about 10 to 30 percent coffee solids.

In prior art processes, after leaving the extractor system the coffee extract is clarified of sediment while still at an elevated temperature. One of the most common methods of clarification is by means of a centrifuge in

which the coffee liquid is passed through a rapidly rotating cylinder and discharges the clear liquid. Another method is by means of a pressure pump forcing the concentrate through porous paper or cloth.

Various methods of preparing coffee extracts which may be employed in the process of this invention are described in Sivetz and Foote, "Coffee Processing Technology," vol. 1, pages 261 through 319 and vol. 2, pages 215 through 246, published by the AVI Publishing Company, Inc., Westport, Conn. in 1963. In addition, process and equipment described in the following U.S. patents can be employed in preparing coffee extracts useful in the process of this invention: 2,340,758; 2,410,157; 2,515,730; 2,915,399; 2,915,403; 2,929,663; 2,783,149; 2,437,768

After being freed from the sediment, the resulting coffee extract is then subjected to concentration by partial freezing of the water therefrom. This freeze concentration process can be conducted in batch, semi-continuous or continuous apparatus according to methods known to the art and improvements of the methods. However, any method of removing the water from the coffee extract by crystallization as ice is applicable to the process of this invention. The resulting slurry of ice and concentrated coffee extract is then subjected to centrifugation to free the concentrated solution of the ice crystals. The resulting ice crystals are ordinarily washed with water or dilute coffee extract to free the ice crystals completely of residual mother liquor and the washings may be returned to the freeze concentration process or to the extractors or to existing spray dryers.

The freeze concentration of the extract can be accomplished in either a single stage or in a plurality of stages each of which comprises a crystallizer in which heat is removed from the coffee extract to form a slurry of ice crystals and concentrated mother liquor. After each crystallization stage, ice is removed from the slurry and the concentrated extract either goes to further processing in the preparation of soluble or powdered coffee or is further concentrated in a subsequent stage of the freeze concentration process. The crystallization of ice from the extract is preferably carried out in a tubular heat exchanger, the outside surfaces of which are cooled by a circulating refrigerant. The internal section of the tube is ordinarily fitted with a shaft on which is located agitator paddles. Alternatively, a conventional scraped surface tubular heat exchanger may be employed. Any acceptable separating device or centrifuge may be employed for separating the concentrated coffee extract from the resulting ice crystals. This centrifuge is the preferred method for separating ice from the mother liquor and ordinarily consists of a rotating basket which contains perforations for allowing passage of the mother liquor. The centrifuge may also be equipped with some means for washing residual mother liquor from the ice crystals.

After concentration by partial freezing and separation of the resulting ice crystals, and prior to relatively complete dehydration by freeze drying, the concentrated coffee extract may contain from less than 30 to about 50 percent or more by weight of coffee solids. To reduce the water removal requirements of the freeze drying step, it is preferred that the effluent from the concentration by partial freezing contain as high as possible a percentage of coffee solids. However, the higher the percentage of coffee solids, the more viscous is the coffee liquor and the more difficult it is to separate efficiently from the ice crystals. Thus, a preferred embodiment of this invention comprises partially concentrated coffee extract having up to about 50 percent coffee solids prior to relatively complete dehydration by freeze drying.

Processes for concentration of the extract by a freezing process are described in vol. 2, pages 14 through 21 of Sivetz, Coffee Processing Technology (The AVI Publishing Co., 1963). In addition, various processes for freeze concentration are described in the following U.S. patents: 2,977,234; 2,967,778; 2,888,353; 2,887,851; 2,862,824; 2,854,494; 2,851,368; 2,815,288; 2,800,001; 2,764,880; 2,764,488; 2,735,779; 2,734,355; 2,676,469; 2,657,551; 2,657,549; 2,559,204; 2,552,525; 2,552,523; 2,503,695.

After the coffee extract has been concentrated by partial freezing and separation of the resulting ice crystals, it is dehydrated to powder form by a method known in the art as freeze drying. According to this method, the coffee extract is frozen to a low temperature and subjected to vacuum conditions so that the ice sublimes away from the mass, leaving only the coffee solids containing but a small amount of water. During the vacuum sublimation of the ice, heat must be supplied to maintain the temperature at the particular level required to maintain the process at the vacuum conditions selected. Processes for freeze drying coffee extract are described in Van Arsdel, Food Dehydration, I, Principles, and Copely and Van Arsdel, Food Dehydration II, Products and Technology, both published by the AVI Publishing Company, Inc., Westport, Conn., 1963 and 1964 respectively. In addition, freeze drying processes and equipment are described in U.S. patents: 2,620,573; 2,292,447; 3,132,929; 2,445,120; 1,979,124; 2,414,940; 2,302,253; 2,731,734; 2,994,132; 3,078,586; 3,132,930; 3,146,077; 3,178,829; 3,192,643; 3,199,217; 3,174,229; 2,353,986; 2,751,687; 2,411,152; 2,225,627; 2,374,232; 2,616,604; 2,903,139; 3,013,341; 3,088,222; 3,135,589; 3,176,408; 3,184,862; 3,192,645. To accomplish this freeze drying, the coffee solids are generally frozen to a temperature between —40° F. and —50° F., and subjected to pressures ranging from .250 mm. of Hg to .200 mm. of Hg. Depending upon the condition employed, residence times in the batch freeze drying apparatus vary from less than 4 to 10 hours, or longer. Where continuous freeze drying is employed, then residence time will be as long as 20 hours, or longer.

Coffee solids are generally dehydrated in this process to have between about 1 and 5 percent residual water. Therefore, as used throughout this specification, the term completely dehydrated coffee solids refers to the dehydrated coffee product prepared by freeze drying which contains from 1 to 5 percent moisture.

The soluble powdered coffee product prepared by the process of this invention has many advantages over the powdered material prepared by prior art processes. By following the process of this invention, the powdered coffee product has a flavor and aroma much more closely resembling that of freshly brewed coffee. This is because freeze concentration, combined with freeze drying, operates under such conditions whereby a minimum of the volatile coffee flavor and aroma elements are removed during processing. Furthermore, the soluble coffee product produced by the process of this invention may have a higher bulk density than soluble coffee products produced by prior art processes and, in addition, is more readily soluble in cold water than are prior art products and is darker in color.

EXAMPLE I

Ground coffee and water are charged to a countercurrent extractor and extracted to result in an extract containing 24 percent soluble coffee solids. This extract was continuously metered into a crystallizer wherein 10 pounds per minute of water formed individual ice crystals to result in a slurry of concentrated coffee, having 32 percent soluble coffee solids and ice. This slurry was conveyed to a centrifuge having a basket rotating at 2200 revolutions per minute and a wash water rate of 4 pounds of fresh water per minute. The concentrated solution of coffee was discharged through the perforated rotating basket as product at the rate of 30 pounds per minute and contained 32 percent soluble coffee solids.

This solution is then poured onto trays and frozen at a temperature of −40° F. Then the trays are inserted into a freeze-drying apparatus. There, the ice in the frozen mass is sublimed as the pressure is reduced. The final pressure vacuum is .250 mm. Heating is applied to the shelves on a programmed basis, with temperature ranging from 250° F. at the beginning of the cycle to 90° F. at its conclusion. Duration of the cycle is approximately 8 hours. The resulting dry coffee product has about three percent moisture and is readily soluble in water. It has a flavor preferably to soluble coffee prepared by other methods.

EXAMPLE 2

A tea extract containing 6.8 percent tea solids, at above 80° F. after extraction, is cooled in a heat exchanger to 36° F. The cooled material is then freeze concentrated in a tubular crystallizer. The resulting ice-concentrated tea slurry is then separated on a rotating basket screen-type centrifuge and frozen solid, then freeze dried to 3 percent moisture to give a superior soluble tea product.

Although the invention has been described with reference to particular embodiments thereof, it is to be understood that various changes may be made without departing from the spirit of the invention as defined by the scope of the appended claims.

What is claimed is:

1. A system of apparatus for preparing a dehydrated coffee or tea beverage product from an aqueous liquid, the extract, comprising:

(a) concentrating means for partially freezing the liquid extract to form ice therein by indirect exchange of heat across a tubular heat exchange surface between the extract and a circulating refrigerant;

(b) means coacting with concentrating means (a) for agitating extract and removing ice from said tubular heat exchange surface;

(c) centrifuge means for separating ice formed in the extract from said liquid extract;

(d) freezing means for freezing the extract;

(e) means for removing moisture under vacuum from frozen extract by sublimation; and

(f) heat source means coacting with vacuum means for heating and drying the frozen extract.

2. The apparatus of claim 1 including means coacting with the centrifuge means (c) for washing ice separated from the extract.

3. The apparatus of claim 2 including means coacting with the centrifuge means (c) for recovering solids from washings.

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ROBERT W. JENKINS, Primary Examiner

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34—92; 99—71

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IN THE

Supreme Court of the United States

OCTOBER TERM, 1983

STRUTHERS PATENT CORPORATION, STRUTHERS WELLS CORPORATION, and STRUTHERS SCIENTIFIC & INTERNATIONAL CORPORATION,

Petitioners,

vs.

THE NESTLE COMPANY, INC.,

Respondent.

ON PETITION FOR A WRIT OF CERTIORARI
TO THE UNITED STATES COURT OF APPEALS
FOR THE THIRD CIRCUIT

RESPONDENT'S BRIEF IN OPPOSITION

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STRUTHERS PATENT CORPORATION, STRUTHERS WELLS CORPORATION, and STRUTHERS SCIENTIFIC & INTERNATIONAL CORPORATION,

Petitioners,

vs.

THE NESTLE COMPANY, INC.,

Respondent.

ON PETITION FOR A WRIT OF CERTIORARI
TO THE UNITED STATES COURT OF APPEALS
FOR THE THIRD CIRCUIT

RESPONDENT'S BRIEF IN OPPOSITION

The Respondent, The Nestle Company, Inc., respectfully requests that the Court deny Struthers' petition for a writ of certiorari, for the reasons set forth herein. The district court's judgment of patent invalidity is supported by a thorough and able opinion, which has been reported at 558 F. Supp. 747, 211 USPQ 1023. The court of appeals affirmed without further opinion, and rehearing in banc was denied by the full court.

COUNTERSTATEMENT OF QUESTIONS PRESENTED

1. Should the Court grant a writ of certiorari to determine matters which have no importance other than to the parties; namely, the correctness of the district court's determinations that in opposing motions for summary judgment of patent invalidity

(a) Petitioners failed to set forth specific facts showing there to be a genuine issue of material fact requiring trial?

(b) Petitioners advanced matters which did not give rise to *genuine* issues of fact, or which were legally irrelevant and hence did not raise *material* issues precluding summary judgment?

(c) Petitioners' naked conclusory averment, unsupported by specific facts or personal knowledge, did not create a genuine factual issue as to events which had been established by unchallenged documentary and testimonial evidence?

2. There being no conflict among the Circuits, should the Court grant a writ of certiorari where the district court merely followed applicable precedent (which has also been adopted by the Court of Appeals for the Federal Circuit) in determining the scope, content and level of skill in the pertinent art by examining the prior patents and publications in that art?

3. There being no conflict among the Circuits, should the Court grant a writ of certiorari where the district court merely followed applicable precedent in ruling that the patentee's prior sale of part of a subsequently patented combination (the other part being old and known, and possessed by the vendee) resulted in invalidity of the patent by reason of the statutory proscription against patenting subject matter which has been on sale more than one year prior to the date of the application for patent?

STATUTES AND RULES

The Petition (p. 2) incorrectly quotes the patent statute, 35 U.S.C. §102(b), in that Petitioner omits the portion (italicized below) which is controlling as to one of Petitioners' alleged grievances. The statute provides:

> **§ 102. Conditions for patentability; novelty and loss of right to patent**
>
> A person shall be entitled to a patent unless—
>
> (b) the invention was patented or described in a printed publication in this or a foreign country *or in public use or on sale in this country,* more than one year prior to the date of the application for patent in the United States, ...

The Petition (p. 2) also quotes paragraph (c) of Rule 56, Federal Rules of Civil Procedure, relating to Summary Judgment, but neglects to set forth pertinent paragraphs (e) and (f) of that Rule, which are controlling as to other of Petitioners' alleged grievances:

> (e) Form of Affidavits; Further Testimony; Defense Required. Supporting and opposing affidavits shall be made on personal knowledge, shall set forth such facts as would be admissible in evidence, and shall show affirmatively that the affiant is competent to testify to the matters stated therein. Sworn or certified copies of all papers or parts thereof referred to in an affidavit shall be attached thereto or served therewith. The court may permit affidavits to be supplemented or opposed by depositions, answers to interrogatories, or further affidavits. When a motion for summary judgment is made and supported as provided in this rule, an adverse party may not rest upon the mere allegations or denials of his pleading, but his response, by affidavits or as otherwise provided in this rule, must set forth specific facts showing that there is a genuine issue for trial. If he does not so respond, summary judgment, if appropriate, shall be entered against him.
>
> (f) When Affidavits are Unavailable. Should it appear from the affidavits of a party opposing the motion that he cannot for reasons stated present by affidavit facts essential to justify his opposition, the court may refuse the application for judgment or may order a continuance to permit affidavits to be obtained or depositions to be taken or discovery to be had or may make such other order as is just.

COUNTERSTATEMENT OF THE CASE

Petitioner Struthers Wells Corporation owns some 80% of the voting stock of its subsidiary, co-petitioner Struthers Scientific & International Corporation. Struthers Scientific was the patent owner and plaintiff (or declaratory judgment defendant) in a series of extensively litigated prior actions in which six of the ten patents here in suit were asserted against General Foods Corporation (A45).[1]

General Foods had purchased a freeze concentration system from Struthers for use in making instant coffee, and alleged that Struthers' personnel had gained access to General Foods' plants to install and service that equipment. Struthers did not make application for the patents until a time subsequent to those events. General Foods contended that Struthers, which had no background or experience in coffee processing, had misappropriated and wrongfully patented General Foods' technology (JA4399-4403).

The bitterly contested proceedings were settled in February 1972.[2] Thereupon, the patents were transferred by Struthers

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[1] The appendix to Struthers' Petition is cited by the prefix "A" and page number. "JA" citations are to the Joint Appendix filed in the court below, which has not been transmitted to the Court. All emphasis is supplied.

[2] The settlement with General Foods, which Struthers touts (Pet. 4), bought termination of six patent infringement suits, two Patent Office interference proceedings and 21 opposition proceedings in Britain and Canada, as well as express withdrawal of serious charges of fraud Struthers had leveled (JA1586). Collectively, those contested proceedings would have cost a fortune to try in a plurality of forums. General Foods' Manager of Patent Litigation testified in this action:

> Frankly, I wanted to get rid of this lawsuit and the corporation wanted to get rid of it, and I wanted nothing more to do with it. We had paid a sizeable price in terms of legal expense just to get rid of a nuisance suit. (JA2686)

(Footnote continued on following page)

Scientific to co-petitioner Struthers Patent Corporation, its wholly owned subsidiary and the nominal plaintiff below, in order that Struthers Patent could bring this action (in April 1972) in its own name (Reply ¶¶ 9-10; JA433-434).

In contemplation of suit against Nestle, Struthers also carried out massive destruction of relevant documents which had been assembled in the General Foods litigation, notwithstanding the express terms of an order entered in that prior litigation (A60-111). The document destruction program was directed by William Drucker, a patent attorney who was president of plaintiff and an officer of each counterdefendant. Drucker had guided the litigation with General Foods, and he also participated actively as counsel for Struthers in this litigation. The district court found that both Drucker and Struthers lied under oath concerning the destruction (A72-78).

As Petitioners acknowledge (Pet. 3), the ten patents in suit all relate to freeze concentration. Nestle has made and sold coffee products for many years, but has not used freeze concentration.[3] An independent expert appointed by the district court inspected Nestle's manufacturing plants and the detailed plant drawings, and thereafter testified there was no indication that Nestle employed freeze concentration in its manufacturing process (JA6358-6360).

Freeze concentration is an old and well known means for removing part of the water from a solution, thereby concentrating it. In contradistinction to heating the solution to boil off a part of the water, the solution is instead chilled sufficiently to form some ice, which is then removed mechanically by filtering or centrifuging. The prior art is replete with detailed teachings of freeze concentration processes, apparatus and

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(Footnote continued from preceding page)

> And I say with no reservation that the patents that were in suit, were considered then and in my personal opinion [are] considered now, to cover subject matter which was really not patentable, was perfectly obvious .... (JA2771)

[3] Respondent, The Nestle Company, Inc., is a New York corporation. Its parent is Nestle Enterprises, Inc., a Connecticut corporation, which is owned by Nestle S.A., a Swiss company.

related ancillary expedients, and their use to concentrate a wide variety of solutions and beverages, including coffee.[4] The district court observed:

> As an examination of the prior art record discloses, this subject matter is a well ploughed field. For decades patents have been filed, articles written, and research and development undertaken in every phase of freeze concentration processes and equipment. The same record discloses that the skill in the art by this late date is very high. Not only is the skill in the art high, the subject matter is relatively simple, easily understandable by a person having limited or no technical background in this field.
>
> After reviewing the entire record applicable to all ten patents I concluded that it can be determined that there is no genuine issue of fact that the various changes and alleged improvements which Struthers has introduced into the prior art either are no more than cosmetic differences without any patentable significance or else, if they can be seen as improvements, are such as would have been obvious to one skilled in the art. (A52-53)

Nine of the patents in suit have been held invalid by reason of obviousness in view of the published prior art, 35 U.S.C. §103, among other grounds. The ground of obviousness was not reached as to the tenth patent; it was held invalid under 35 U.S.C. §§102(d) and 112, and Struthers does not challenge those rulings.[5]

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[4] Another group of freeze concentration patents, not owned by Struthers, was held invalid over the prior art in *Sperti Products, Inc.* v. *The Coca Cola Co.*, 272 F. Supp. 441 (D. Del. 1967), *aff'd per curiam*, 399 F.2d 607 (3d Cir. 1968). See also *Application of Clinton*, 527 F.2d 1226 (CCPA 1976), discussed in the opinion below at A155-160.

[5] The Petition alleges error only as to the §103 (obviousness) and §102(b) (prior sale or use) holdings. Four of the patents were invalidated on other grounds, which Struthers does not challenge. Were the Court to grant review and affirm the §103 rulings, all of the patents would be disposed of. Affirmance of only the §102(b) rulings would leave for consideration by the Court the alternative grounds supporting the judgment advanced in Nestle's motions as to two of the patents, *viz.*, abandonment by operation of law, §102(b) prior

(Footnote continued on following page)

Six of the patents invalidated for obviousness under §103 were additionally held invalid on the independent ground of Struthers' own prior sale and offers for sale or public use of the patented subject matter more than one year prior to making application for the patents (35 U.S.C. §102(b), quoted *ante*). By 1963 Struthers was actively engaged in commercial exploitation of the subjects matter it later patented (Pet. 6-7). In 1964 it published an advertising brochure (A161-163) offering for sale its "FreCon" freeze concentration process and apparatus to concentrate coffee, juices and other beverages. The brochure also advertised the availability of a so-called mobile FreCon pilot plant mounted on a railroad flat car, which Struthers had constructed earlier that year to aid in attracting customers (A166-168). The mobile plant was used by General Foods at its Winter Haven plant during April and May 1964 to concentrate both orange juice and coffee (Pet. 7). Meanwhile, in January 1964 Struthers had submitted to General Foods a "firm proposal for a plant to concentrate coffee extract," having an annual commercial capacity of more than three million pounds of coffee solids (A169-170). The formal contract of sale was signed in August 1964. Struthers did not file its initial applications for patent until December 1965 and January 1966.

Struthers would have the Court believe that its patents are "commercially substantial" (Pet. 4), but the record belies that assertion. General Foods found the Struthers processes and equipment to be unsatisfactory, and turned to other vendors to replace them (A44). Struthers' counsel acknowledged below that Struthers long ago abandoned the business:

> There is no showing that Struthers has been actively involved in the business of selling coffee technology since

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(Footnote continued from preceding page)

sale, offer for sale or use, §112 insufficiency, double patenting and extension of monopoly, and Struthers' withholding of material information from the Patent Office (*see* Final Order, A8-22). Reversal of both the §103 and §102(b) rulings would entail consideration by the Court, as to six patents, of those matters and in addition Nestle's grounds of collateral estoppel, failure to prosecute in the manner required by law, late claiming, and inadequate oath or declaration, *inter alia*. We do not address these matters at this time.

> 1972 or 1973, when Mr. Drucker last testified. I venture to say if they attempted to find out what Struthers is doing today, they would see that it has been entirely inactive in this field and doesn't have any great, abiding interest in doing anything but vindicating their patents and obtaining compensation for the infringement of their patents. (May 1, 1980 Hearing, Tr. 16)

THE PROCEEDINGS BELOW

The ten interrelated patents in suit were considered in four groups. Nestle filed separate motions as to each group seeking summary judgment of invalidity and/or unenforceability of the patents on various grounds, and supported each motion with the pertinent Patent Office file wrappers, prior art patents and publications, documents and testimony from the prior General Foods litigation, and Struthers' answers to interrogatories in this action and in the General Foods litigation. There was no challege to authenticity or admissibility of any of the materials upon which Nestle relied.[6]

The motions were extensively briefed. Struthers had periods of four to six months to respond to the motions, and it submitted a series of affidavits by its employee, Ganiaris, in an effort to fend off summary judgment. The district court heard lengthy argument of the motions in June 1981, and accepted additional Ganiaris affidavits at the hearings.

Judge Debevoise's district court opinion is both painstaking and thorough. It occupies 478 pages in the Appendix to the Petition (A31-508), and has been published at 558 F. Supp. 747, 211 USPQ 1023. Although Struthers criticizes the opinion as "prolix" (Pet. 13), a fair reading shows that the opinion itself amply refutes this, and other, of Struthers' attacks.[7] Judge Debevoise wrote:

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[6] The materials from the General Foods litigation were either obtained from the files of the Delaware district court and marked for identification at a deposition taken by Nestle in the fall of 1972, or were produced by Struthers in this action pursuant to court order.

[7] For example, Struthers relies heavily on Judge Latchum's thirteen-year-old decision in *Struthers Scientific and Int. Corp.* v.

(Footnote continued on following page)

> So vast is the record submitted in support of the summary judgment motions that it is a temptation to conclude that, amidst it all, genuine issues of material fact must exist. However, the trial of this case would impose such a heavy burden upon the parties and upon the resources of the Court, particularly as a jury has been requested, that I concluded that every effort had to be made at this time to comb the record and to determine if such issues do, in fact, exist. This is what I attempted to do, and the necessity to describe for the record the results of this inquiry is the cause of this regrettably (but I think necessarily) long opinion. (A48-49)
>
> * * *
>
> There is one final point I wish to make before turning to the individual motions. I am more confident in my conclusions by reason of the fact that each party has been represented by extraordinarily able counsel. Each legal issue has been briefed and argued exhaustively. Each side has probed the record and has, I am sure, discovered and impressed upon me every fact or circumstance supporting its position. (A59)

New counsel retained by Struthers did not request rehearing before the district court, and has instead included in the Joint Appendix below some 1600 pages of materials which neither party relied upon before the district court. Judge Debevoise consequently had no occasion to consider those items in connection with the motions; yet certain of them have been advanced *de novo* on appeal, and the Petition unfairly criticizes the district court for failing to draw inferences from those documents (*e.g.*, Pet. 23).

(Footnote continued from preceding page)

General Foods Corp., 314 F. Supp. 313 (D. Del. 1970), which denied summary judgment as to two (not three) of the patents "on the basis of the present record" because "the Court is unable to state with any degree of certainty *at this stage of the litigation* that no genuine issue of material fact exists" (Pet. 14). As Judge Debevoise pointed out, "the record before Judge Latchum must have been very different from, and far less extensive than, the record in the present proceeding" (A193).

The arguments Struthers made before the court of appeals, and which it now repeats in the Petition, rested largely on the new documents (*e.g.*, the memorandum printed at A675-83) and on new theories (*e.g.*, experimental use) advanced for the first time on appeal. That effort to begin anew has not succeeded. The court of appeals affirmed on the district court's opinion (A2), and a petition for rehearing in banc was denied (A4).

As we shall demonstrate, no special or important reasons have been advanced which would warrant still further review, and there is no conflict among the Circuits concerning the applicable legal principles. Neither is there any need for exercise of the Court's power of supervision. The particular matters which have been determined below have no importance other than to the parties, and need not detain the Court.

REASONS WHY THE WRIT SHOULD BE DENIED

1. The Judgment Entered Below Was Fully in Accordance with Rule 56.

Judge Debevoise focused on the Ganiaris affidavits which Struthers submitted in an effort to raise factual issues precluding summary judgment. The court denied judgment on certain of the grounds advanced by Nevve because it concluded that facts material thereto were in dispute (*e.g.*, A233-34, A234-35, A235-36, A484).

In other instances, however, Ganiaris' averments failed to raise *genuine* issues of fact (*e.g.*, as when he erroneously swore that an item of published prior art did not contain disclosure which in fact specifically appeared on its face). Several of the averments failed to raise *material* issues (*e.g.*, as when Ganiaris sought to distinguish over prior art on the basis of alleged distinctions not set forth in the patent claims). In these circumstances, there was no need for countering affidavits (*cf.* Pet. 4). Rule 56(e), F.R.Civ.P. (quoted *ante*), places on the party opposing summary judgment the burden of "set[ting] forth *specific facts* showing that there is a genuine issue for trial. If he does not so respond, summary judgment, if appropriate,

shall be entered against him." That is what has happened here, and quite properly so.[8]

Struthers did not make any claim before the district court that it was unable to obtain facts essential to justify its opposition to the motions, nor did it contend that depositions or other forms of discovery were needed (*see* F.R.Civ.P. Rule 56(f), quoted *ante*). Consequently, the suggestion that Struthers did not have "an opportunity to present evidence" which "might have" led to a different outcome below (Pet. 8) is as disingenuous as it is erroneous. Struthers was never cut off from offering evidence. The district court even accepted affidavits which had not been served prior to the hearings (A483; JA4930; JA4994; JA5080-81; JA5952-53). The false allegation of lack of opportunity cannot serve to circumvent Rule 56(e).

Likewise, it begs the question to speculate that there "might have been a different outcome" had Struthers presented additional evidence or other theories at a trial (Pet. 8). If genuine issues of material fact are not raised in opposition to summary judgment, there is no occasion for holding a trial. The same applies to Struthers' *post facto* contention that there were facts "subject to interpretation" allegedly requiring testimony to "explain" them (Pet. 9). The burden was on Struthers to make such a showing, if it could, before the district court. *Cf. Toledo Scale Co.* v. *Computing Scale Co.*, 261 U.S. 399, 425 (1923), articulating "a most salutary rule of law, which, after parties have had a full and fair opportunity to prepare their case, refuses to permit them to drag out litigation by bringing in new evidence which, with due diligence, they ought to have discovered before the hearing."

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[8] Ganiaris is not a lawyer, yet many of his purported averments are couched as legal conclusions or principles (which are frequently erroneous). Other of the averments purport to attest, *ex cathedra,* to the state of mind, intent or beliefs of others. The affidavits ignore in large measure the requirements of Rule 56(e) that averments must be based on personal knowledge, and must show affirmatively the affiant's testimonial competence.

An apposite application of that principle is found in *DeLong Corp.* v. *Raymond International, Inc.*, 622 F.2d 1135, 1140 (3d Cir. 1980). After summary judgment of patent invalidity was granted by reason of the patentee's own prior sale of the later-patented subject matter, the patentee sought via motion for reconsideration to introduce evidentiary materials which allegedly showed that the sale had been for "experimental purposes," and hence was not invalidating. The district court denied reconsideration and the court of appeals affirmed; Rule 56(e) requires that any evidentiary material indicating the existence of a genuine issue of material fact "be presented at the hearing in the district court" and not at some later time.

Struthers' parallel contention that the subject matter it placed on sale was only "in a developmental state at the time in question" (Pet. 8) is even more belated. That contention has been newly formulated for appeal, after being expressly disclaimed below. As Judge Debevoise observed, Struthers did not contest that its offers and sales "were for commercial exploitation rather than for experimental purposes" (A224). Moreover, Struthers' sworn interrogatory answers in this action aver that the affected inventions had been reduced to practice (completed) prior to the offers and sales upon which Nestle relied (JA797-809). Struthers is barred from changing its story on appeal (*cf.* A466).

The principles and procedures mandated by Rule 56 were scrupulously observed below. The Petition presents nothing of significance for the Court to consider.

2. The Holdings of Obviousness Were Properly Founded.

In a transparently Procrustean attempt to bring this case within the Court's Rule 17.1(a), Struthers asserts that the outcome warrants invoking the Court's power of supervision "to establish the limits beyond which summary judgment may not be substituted for a trial" (Pet. 11). This shrill contention is utterly lacking in foundation and cannot withstand analysis.

Judge Debevoise's §103 rulings (invalidity by reason of obviousness in view of the prior art) rested on a careful

comparison of the patented subject matter with the extensive prior art submitted in support of the motions. The court's analysis was fully in accordance with *Graham* v. *John Deere Co.*, 383 U.S. 1 (1966), which the opinion cites and follows (A189). Struthers does not point to any substantive error.

Rather, Struthers mounts a flimsy procedural challenge, and contends that the district court should not have looked to the plain text of the prior art patents and publications in order to determine their scope and content and the level of skill in the art. Instead, says Struthers, the court should have taken account only of "expert" opinion, *viz.*, the partisan, self-serving characterizations of the art set forth in the Ganiaris affidavits (Pet. 13).

Struthers made the same contention before Judge Debevoise, who squarely confronted and disposed of it in the opinion (A190-195). Citing pertinent authority which Struthers does not controvert, the district court followed the well established principle that expert opinion is not required where (as here) the subject matter is readily apprehended and easily understood (A194-195).[9]

That familiar and evident principle has also been adopted and applied by the Court of Appeals for the Federal Circuit. The opinion by Chief Judge Markey in *Chore-Time Equipment, Inc.* v. *Cumberland Corp.*, ____ F.2d ____, 218 USPQ 673

[9] To the several cases cited by the district court may be added *Medical Laboratory Automation, Inc.* v. *Labcon Inc.*, 670 F.2d 671 (7th Cir. 1981); *Research Corp.* v. *Nasco Industries Inc.*, 501 F.2d. 358 (7th Cir.), *cert. denied*, 419 U.S. 1096 (1974); and *Monaplastics, Inc.* v. *Caldor, Inc.*, 378 F.2d 20, 21 (2d Cir. 1967) (where the prior patents and publications show that the differences between the patented invention and the prior art are so small that the invention would have been obvious to "laymen of modest intelligence," the district court had no need for expert testimony concerning the "nature of the prior art or the level of skill in the relevant industry"). *Orthopedic Equipment Co., Inc.* v. *All Orthopedic Appliances, Inc.*, 707 F.2d 1376, 1382 (Fed. Cir. 1983), cited at Pet. 12 n, is not to the contrary. That opinion expressly identified "the sophistication of the technology involved" as a determinant of the level of skill in the art.

(Fed. Cir. 1983), rejected contentions paralleling those Struthers advances here:

> It is undisputed that the district court had before it all of the relevant prior patented art. The subject matter, *i.e.*, the scope and content, of those patents being easily discernible from their drawings and written descriptions, no testimony, expert or otherwise, regarding their scope and content was necessary. (218 USPQ at 675)
>
> Similarly, there is no genuine issue respecting the level of skill in the art. Chore-Time has not shown error in Judge Wilson's determination that because the subject matter of the patent and the prior art were in this case so easily understandable, a factual determination of the level of skill in the art was unnecessary. [Citations omitted.] (218 USPQ at 676)

The procedure followed by the district court was fully in accord with the standards set by the court newly constituted to determine appeals in patent cases. It is likewise in accord with the prior decisions of the other Circuits. There is no conflict.

Struthers' charge that Judge Debevoise "completely disregard[ed]" the Ganiaris affidavits (Pet. 13) is flagrantly untrue. As a reading of the opinion readily shows, each of the affidavits was carefully considered and evaluated in deciding each of the four motions. Even when the court was constrained to regard one of Ganiaris' more overreaching averments (which was both unsupported and contradicted by unchallenged objective evidence) as false, the court nevertheless stated in the very next paragraph of its opinion, "it must be assumed that Ganiaris' other sworn statements are true" (A401). The court also accepted Ganiaris' averments which were in conflict with Struthers' own sworn statements:

> There is no doubt in my mind that the factual material which Nestle submitted in support of its motion for summary judgment of invalidity on the ground of prior sale of the [Group IV Howell] '126 patent was sufficient to grant the motion. In particular, Struthers' answer to General Foods' Interrogatory 119 established the factual basis for such a ruling. The answer stated that Struthers had sold to General Foods in 1964 [equipment which embodied] the very essence of the '126 patent.

> As described above, on the day of argument Struthers submitted an additional affidavit signed by Mr. Ganiaris which, when stripped of its circumlocutions, stated that the answer to Interrogatory 119 was false. This new affidavit did not even attempt to explain why or how a false affidavit [*sic*] was filed. At oral argument Struthers' attorneys simply argued that the new affidavit created a disputed issue of a material fact and that it would be a proper subject of cross-examination at the trial.
>
> Reluctantly I conclude that for the time being, at least, the affidavit does create an issue of material fact and precludes granting summary judgment on this ground. Nevertheless, Struthers' casual treatment of the filing of a false statement under oath with a court (even though it was not this Court) is unacceptable. If this case is not concluded by disposition of the motions for summary judgment and any appeals therefrom, the matter will have to be pursued further. (A482-484)

Struthers' unworthy charge thus rings hollow. The "basic error" and "aberration of long accepted principles of summary judgment" of which Judge Debevoise stands falsely accused (Pet. 13) are concocted, and not at all real.

Semantic devices, such as terming Ganiaris an "expert" (Pet. 5, 13) and labeling his affidavits as being in "good faith" (Pet. 14), cannot shield the respects in which they were deficient and failed to meet the tests prescribed by Rule 56(e). Only those averments which showed the existence of *genuine* issues of *material* fact were entitled to consideration. The remainder were not.

For example, Ganiaris swore that the prior art Flosdorf '681 patent did not contain certain disclosure which Nestle attributed to it. The district court opinion pointed out that Ganiaris was "simply wrong," and quoted from the Flosdorf patent to show that it did indeed contain that exact disclosure (A208). Ganiaris' factual error (which Struthers could not repair) did not raise a *genuine* issue of fact. It posed no impediment to summary judgment, and perforce did not require resolution by a jury. Under Rule 56(c), it was entirely appropriate for the court to proceed as it did.

The same is true of the several instances in which Struthers, through Ganiaris, sought to manufacture issues as to matters which were legally irrelevant. Struthers cannot challenge the principle of law (amply supported by cited authority) Judge Debevoise applied: "It is a fundamental principle of patent law that features not recited in a claim cannot be relied upon to establish patentability" (A207). The several averments of irrelevant matters consequently did not raise issues of *material* fact. They are of no avail to Struthers, and would not be admissible in a jury trial.

In entering summary judgment of invalidity by reason of obviousness under §103 on those grounds as to which Struthers failed to set forth specific facts showing that there is a genuine issue for trial, the district court acted fully in accordance with Rule 56, as well as with the Court's decision in *Poller* v. *Columbia Broadcasting System, Inc.*, 368 U.S. 464, 468 (1962) ("the purpose of the rule is not to cut litigants off from their right of trial by jury *if they really have issues to try*"). Consequently, the decision below does not constitute a "stunning precedent with which to foreclose a litigant's right of trial by jury," as Struthers fancifully contends (Pet. 15). The asserted need for further review is non-existent.

3. The Holdings of Prior Sale and Use Do Not Merit Review.

Of the nine patents held invalid under §103 for obviousness in view of the prior art, six were additionally held invalid under §102(b) because their subjects matter had been in public use or on sale in this country more than one year before Struthers made application to patent them. Struthers extravagantly charges that these holdings constituted "an unwarranted extension of the strictures [*sic*] of §102(b)" (Pet. 15); but the contrary is the case. The rulings were fully in accordance with applicable precedent. It is convenient to consider individually the two groups of patents held to have been in public use or on sale.

A. The Group I Muller Patents.

The Muller patents call for conjoining two old and well known techniques, freeze concentration and freeze drying (Pet.

15). Freeze drying (also known as lyophilization) involves completely freezing the solution to a rigid state, and then applying a high vacuum so that the frozen moisture sublimes (*i.e.*, passes directly to the vapor state, without melting). As freeze drying is a relatively expensive way of removing water, it is economically desirable to reduce the amount of water present by concentrating the solution prior to drying. Freeze concentration is one such method of concentration.

More than one year before the application for the Muller patents was filed, Struthers' November 1964 FreCon advertising brochure publicized the economic advantage of joining the two processes:

> Q. What is the difference between freeze concentration and freeze drying?
>
> A. *** Freeze concentration is far less expensive than freeze drying per pound of water removed. Thus, where it is desired to reduce a liquid to a dried product, it is more economical to install a freeze concentration plant as the first step, followed by freeze drying. (A162)

Prior to publication of the Struthers brochure General Foods had developed a coffee product (Maxim) made by freeze drying, and in late 1963 expressed interest in Struthers' freeze concentration system (Pet. 7). Struthers' own documents show its awareness, at the time of its January 1964 firm offer to sell a commercial scale freeze concentration (FreCon) plant to General Foods, that the plant was to be used in the manufacture of freeze dried Maxim coffee (A170-171). Struthers' January 1964 offer, and August 1964 sale, of freeze concentration process and equipment for use in conjunction with the commercially available freeze drying process and equipment already in place at General Foods' Hoboken plant completed the combination which Struthers belatedly applied to patent in Muller's name well over a year later.

Struthers nevertheless argues that because General Foods bought the freeze drying process and equipment from someone other than Struthers, the combination of freeze concentration with freeze drying was not on sale. The contention is sophomoric. Under the plain language of §102(b) it does not matter *who* has previously offered for sale the later-patented subject

matter. Struthers' undisputed offer and sale of the missing piece of the patented combination to one who had earlier purchased the other part was like inserting the last piece in a jigsaw puzzle, *cf. Sinclair & Carroll Co.* v. *Interchemical Corp.*, 325 U.S. 327, 335 (1945). The result was exactly the same as though Struthers had supplied the freeze drying system as well. It is thus immaterial on the facts of this case that "Struthers never sold freeze drying apparatus to anyone" (Pet. 17).

Directly in point is *DeLong Corp.* v. *Raymond International, Inc.*, 622 F.2d 1135 (3d Cir. 1980), a case which Struthers cites (Pet. 16). The patentee had made a prior sale of some, but not all, of the elements comprising the patented combination. The remaining elements were possessed by his vendee. The patentee, like Struthers here, unsuccessfully argued that his sale was not invalidating because he had not sold the complete combination claimed in his later-procured patent. The court rejected that contention and affirmed the holding of invalidity. The portion which the patentee did not supply was not novel; it was known and available in the prior art (622 F.2d at 1142-43).

In the present case, the freeze drying part of the combination was likewise well known and available to those in the art (including General Foods) before Struthers' offers and sale of the freeze concentration part. Indeed, Struthers' Muller patents termed freeze drying "a method known in the art" (A718 at Col. 3, lines 72-73), and additionally cited some 29 prior patents and two standard texts for their description of freeze drying processes and equipment suitable for use in the Muller combination (A718 at Col. 4, lines 5-17).

The judgment below is thus fully consistent with the principles applied in *DeLong*. The Petition, by contrast, is notably bereft of citation of decisional authority supporting Struthers' opportunistic but meritless argument. Only cases dealing with infringement under 35 U.S.C. §271 are discussed (Pet. 17-18), and they are clearly inapposite. None of them is concerned with the on-sale bar of §102(b).

As the Court of Appeals for the Federal Circuit has observed, the intent of §102(b) is "to preclude *attempts* by the

inventor or his assignee to profit from commercial use of an invention for more than a year before an application for patent is filed. *** An offer to sell is sufficient under the policy animating the statute, which proscribes not a sale, but a placing 'on sale'." *The D. L. Auld Co.* v. *Chroma Graphics Corp.*, ____ F.2d ____ (No. 83-585, Fed. Cir., August 15, 1983) (Slip Op. 6, 14). Struthers unquestionably profited from its part in General Foods' procurement of the Muller combination; the August 1964 contract price was $133,100 (JA3319). Additionally, by advertising the combination, and by offering and selling its freeze concentration system to those engaged in freeze drying, Struthers expanded its market beyond processors who merely canned or froze a beverage concentrate. It thereby attempted to derive commercial advantage from the combination, no matter whether Struthers or someone else might supply the freeze drying part.

As stated in *Kock* v. *Quaker Oats Co.*, 681 F.2d 649, 655 (9th Cir. 1982), *cert. denied*, 74 L.Ed.2d 994 (1983):

> To avoid the on sale bar, the inventor must further show that the transferee lacked authority to use the invention or exploit its commercial value. Where an inventor makes a simple outright sale, with the buyer to manufacture, refine, or sell the invention as the buyer chooses, and with no enforceable obligation on the buyer to hold the invention or design for experimental purpose only, the sale is for profit and, if made before the critical date, will invalidate the patent.

General Foods not only had full authority to use the patented combination, it in fact did so. In addition to the contract price, General Foods paid the sum of $10,000 as royalty for commercial use of the plant (A170, A174). *See Hall* v. *Macneale*, 107 U.S. 90, 96 (1883)(prior use by others with the consent and allowance of the patentee).[10]

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[10] Muller, a Struthers vice president, sent samples of General Foods' Maxim product to each member of the board of directors in 1965 with a note announcing that it was "made by removing about ½ the water by the Struthers FreCon process, followed by freeze drying to the crystalline powder form" (JA6218).

The wholly artificial construction of §102(b) urged by Struthers would do violence to the statute and frustrate its purpose. The courts below properly rejected Struthers' attempt to rewrite the law. They instead followed applicable precedent, and that does not provide occasion for review here.

B. The Group III Reimus Patents.

The Reimus "dewaxing" subject matter was publicly used during sales demonstrations of freeze concentration on Struthers' mobile flat car unit at General Foods' Winter Haven plant in May 1964, more than one year prior to Struthers' December 1965 initial application for the Reimus patents. A cheesecloth filter was employed on that occasion to remove "waxy" precipitate from cooled coffee extract, as detailed in the district court's opinion (A377-A383). The episode was described in General Foods' September 1964 Gottesman memorandum, which recommended that filtering means be installed in the FreCon system General Foods had by then contracted to purchase from Struthers (A383).[11] The patents are consequently invalid. *E.g., In re Smith,* ____ F.2d ____ (No. 82-592, Fed. Cir., August 3, 1983) (demonstrations invalidated patent subsequently applied for).

In challenging the invalidation of the Reimus patents on these facts, the Petition does not raise any legal issue concerning the scope or meaning of §102(b). Struthers instead reverts to charging that the district court erred in not blindly accepting one of Ganiaris' averments. The attack is phrased in terms of an improper judging of Ganiaris' "credibility" (Pet. 20), and it is darkly suggested that "the outcome might have been different" if Ganiaris had been given an opportunity to testify at a trial (*Id.*). All of this amounts to nothing more than dressing a plain failure to meet Rule 56 standards in colorful clothing, and then rearguing it under a §102(b) heading.

Struthers acknowledges that the facts pertaining to the May 1964 episode are "indisputable" (Pet. 19), and the

[11] The Gottesman memorandum is dated some four months after the May episode, not "more than a year after the event," as Struthers erroneously states (Pet. 21).

authenticity of the 1964 Gottesman memorandum has not been questioned. Rather than seeking to raise a triable issue as to those indisputable facts, Struthers sought to obliterate them. It procured Ganiaris to swear, *ex cathedra,* that "[p]rior to January 1965, General Foods did not even appreciate that a dewaxing operation was necessary" (A633). Not surprisingly, the district court was constrained to regard Ganiaris' wholly unsupported allegation as false; but the ruling did not rest on that observation. The opinion further stated:

> "Ganiaris' affidavit cannot create a factual issue as to these events by stating generally that prior to January 1965 General Foods did not appreciate that a dewaxing operation was necessary" (A400).

Notably, Struthers has no substantive answer to Judge Debevoise's trenchantly accurate observation. Its attempt to recast the basis of the holding ignores that the court properly applied Rule 56(e). Ganiaris' naked allegation did not set forth *specific facts* showing there to be a genuine issue for trial. Consequently, his unsupported conclusory assertion had "no probative force when weighed against the overwhelming objective evidence to the contrary." *Super Mold Corp.* v. *Clapp's Equipment Division, Inc.,* 397 F.2d 932, 935 (9th Cir. 1968). *See also The D.L. Auld Co.* v. *Chroma Graphics Corp.,* ____ F.2d ____ (No. 83-585, Fed. Cir. August 15, 1983) (affirming summary judgment of patent invalidity for prior sale).

Moreover, Ganiaris' averment was testimonially incompetent, and hence not admissible. He did not aver that he was present at the May 1964 use of the mobile unit at Winter Haven, and he advanced nothing which would draw into question the statements contained in Gottesman's memorandum. Rule 56(e) requires that affidavits be made on *personal* knowledge, set forth *facts* admissible in evidence, and show affirmatively that the affiant is *competent* to testify on the matter set forth. The district court did not err in declining to accept Ganiaris' incompetent generalization as raising a genuine issue of fact.

Struthers' argument that it was improper for the court "to assess as false Ganiaris' statement on so subjective a matter as

what General Foods 'appreciated'" (Pet. 21) puts the shoe on the wrong foot. The impropriety resides in Struthers' procuring Ganiaris to swear to a "subjective" matter, and in then advancing his unsupported averment as allegedly creating a factual issue. Struthers' failure to heed Rule 56 cannot be shifted to Judge Debevoise's shoulders.

Persisting in its attempt to argue the motions *de novo* on appeal, Struthers belatedly advances (Pet. 21-23, A675-683) a 1965 Ganiaris memorandum which was *not* an exhibit to the Ganiaris affidavit and was *not* advanced before the district court in briefing or at the hearing (and which does *not* deal with the state of mind of General Foods' personnel who were present at the mobile unit episode in May 1964). The memorandum, and the construction Struthers would place on it, accordingly cannot be considered now. *Toledo Scale Co.* v. *Computing Scale Co., ante,* 261 U.S. 399, 425; *DeLong Corp.* v. *Raymond International, Inc., ante,* 622 F.2d 1135, 1144.

Summary judgment "cannot be defeated by the vague hope that something may turn up at trial." *Perma Research and Development Co.* v. *Singer Co.,* 410 F.2d 572, 578 (2d Cir. 1969). No useful purpose would be served by grant of certiorari to review Struthers' repeated failures to comply with Rule 56. Neither is there need for the Court to recanvass Struthers' inability to present specific facts showing there to be a genuine issue for trial, as distinguished from "sham issues which should not subject the defendant to the burden of a trial." *Radobenko* v. *Automated Equipment Corp.,* 520 F.2d 540, 543-44 (9th Cir. 1975). The court of appeals has performed that task, and it affirmed without further opinion.

CONCLUSION

For these reasons, the Petition for writ of certiorari should be denied.

Respectfully submitted,

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No. 83-132

IN THE

Supreme Court of the United States

OCTOBER TERM, 1983

STRUTHERS PATENT CORPORATION,
STRUTHERS WELLS CORPORATION and
STRUTHERS SCIENTIFIC & INTERNATIONAL CORPORATION,
Petitioners,

–against–

THE NESTLE COMPANY, INC.,
Respondent.

ON PETITION FOR A WRIT OF CERTIORARI
TO THE UNITED STATES COURT OF APPEALS
FOR THE THIRD CIRCUIT

PETITIONERS' REPLY BRIEF

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No. 83-132

IN THE

Supreme Court of the United States

October Term, 1983

STRUTHERS PATENT CORPORATION,
STRUTHERS WELLS CORPORATION and
STRUTHERS SCIENTIFIC & INTERNATIONAL
CORPORATION,

Petitioners,

–against–

THE NESTLE COMPANY, INC.,

Respondent.

PETITIONERS' REPLY BRIEF

STATEMENT

Respondent, in urging this Court to deny the petition for certiorari, has argued, incorrectly, that this matter has no importance other than to the parties; that petitioners failed to set forth specific facts showing genuine issues of material fact requiring trial; that the district court merely followed applicable precedent in determining the scope, content and level of skill in the pertinent art by examining the prior patents and publications in that art; and that the district court merely followed applicable precedent in ruling that the patent owner's prior sale of *equipment* capable of performing only one part of a claimed two-part unitary *process*, constituted an invalidating prior sale under 35 U.S.C. § 102(b).

These arguments are without basis in fact or in law. Respondent has also attempted herein to create confusion by irresponsibly asserting that the documentary evidence which petitioners presented to the Court of Appeals in connection with this appeal were not before the district court on the motions for summary judgment and were advanced for the first time on appeal. Nothing could be further from the truth.

The plain fact is that the documentary evidence to which petitioners have adverted in their petition and which they placed before the Court of Appeals, *was introduced by respondent* in the district court. Respondent relied upon certain of these documents in connection with its motions for summary judgment and the district court based summary judgment upon selected documents from this group while disregarding others from the same group. It is the process by which the district court selected from the available documentary evidence that which supported its conclusions of patent invalidity while disregarding or ignoring that which could lead to a contrary conclusion which has led to the egregious and unprecedented result below.

Petitioners respectfully request the Court to consider the following:

¶ The documentary evidence to which respondent so vigorously objects now was among that which was submitted to the district court below by respondent as exhibits to the affidavit of Stevan J. Bosses, dated January 14, 1976. Mr. Bosses was at that time a member of the law firm which was counsel to respondent in the district court action.

¶ Respondent used a great many of the Bosses exhibits in compiling its exhibit books in connection with the motions for summary judgment and used certain of them directly from the affidavit itself. For example, respondent's Group III memorandum, at page 15, refers to General Foods' answer to Struthers'

second Interrogatory 12(e) and (i),[1] on "file with this Court as defendant's [respondent Nestle] deposition, Exhibit C, Tab 29." The document referred to is one of the exhibits attached to the Bosses affidavit. Respondent also refers in that same Group III memorandum, at page 62, to Struthers' answer to General Foods' Interrogatory 119, stated to be "*on file with the Court* as Nestle deposition Exhibit 39, Tab G." (Actually Tab F.)

¶ Respondent referred in its Group I memorandum, at page 27, to Struthers' answer to General Foods' Interrogatory 51 which is found in defendant's deposition Exhibit 38, Tab A; and at page 45 of this memorandum, to defendant's deposition Exhibit 16, Tab 8, all of which are annexed to the Bosses affidavit.

¶ Respondent stated in all of its motions for summary judgment that it was relying on *"all pleadings and discovery on file herein"* which would include the Bosses exhibits.

¶ *The district court relied on certain of the Bosses exhibits as support for its grant of summary judgment* as shown in the opinion below wherein reference is made to "DDX" exhibits, as these are referred to in the Bosses affidavit. The district court, for example, referred to exhibit DDX 38, Tab A, pp. 8-10 (A-377)[2]; the Saporito deposition transcript, pp. 432-433, *"on file as DDX 16, Tab "* (A-380); and Struthers' answer to General Foods' Interrogatory 6, DDX 16, Tab 8, pp. 5381-5382 (A-381), among others. These exhibits included not only portions of deposition testimony and exhibits but also interrogatory answers, responses to requests for admission and other documentary exhibits.

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1 This document, as is the case with most if not all of the documents attached to the Bosses affidavit, was taken from other, earlier lawsuits between Struthers and General Foods Corporation, entitled *General Foods Corporation v. Struthers Scientific & Int. Corp. and Struthers Wells Corporation*, Civil Nos. 3566, 3665 and 3666, United States District Court for the District of Delaware.

2 Appendix to this petition for a writ of certiorari.

Petitioners are not dealing in "new documents" as respondent says (Resp. Br. p. 10). It should not matter that the Ganiaris memorandum (A-675) was not briefed to the court. It was in the record alongside the Hedrick (A-380) and Gottesman (A-383) memoranda which were similarly not briefed and *on which the court relied* to petitioners' detriment. The rule of law is that the trial court may not "overlook a factual issue even if the parties stipulated that none existed." *Soley v. Star & Herald Co.* 390 F2d 364, 366 (5th Cir. 1968).

GENUINE ISSUES OF MATERIAL FACT EXIST AS SHOWN IN GANIARIS' MEMORANDUM

Among the exhibits annexed to the Bosses affidavit is the memorandum of Neophytos Ganiaris, dated February 15, 1965 (A-675-683) which was identified therein as DDX 16, Tab 17.[3] Mr. Ganiaris is an inventor of three of the patents in suit (Nos. 3,531,295; 3,620,034; and 3,636,722). He is also an expert in the subject matter of the patented technology and gave affidavits on behalf of petitioners in connection with their opposition to the motions.

The Ganiaris' memorandum is crucial to an understanding of the significance of the salient facts in the case and raises genuine issues of material fact which should have precluded the grant of summary judgment. The Ganiaris memorandum demonstrates that:

> 1. as of February 5, 1965 a freeze concentration test run on coffee extract at General Foods' Hoboken, New Jersey plant produced "a thick layer . . . of wax on the centrifuge screen";
>
> 2. in the week of February 7, 1965, "continuous operation for more than 30 minutes was impossible due to wax";

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[3] The district court referred to Bosses exhibits DDX 16, Tabs 8, 14 and 16, stopping just short of this exhibit.

> 3. at a meeting on February 10, 1965 among Struthers and Maxwell House [General Foods] engineers it was decided that Maxwell House–Research Division "will initiate laboratory test on wax" and Struthers "will design the dewaxing equipment on the basis of the laboratory data"; and
>
> 4. it was jointly concluded that "Wax in the Extract: This problem did not receive the proper attention from either organization, MH or SS1." (A-675).

It was obviously in this sense, i.e., neither General Foods nor Struthers had paid proper attention to the complexities of the dewaxing problem prior to February 15, 1965, that Ganiaris averred that prior to January 1965 General Foods did not "appreciate" that a dewaxing operation was necessary. The district court's characterization of this statement as "untruthful" and "patently false" (A-399), without hearing the witness testify on the subject, constituted, at the very least, the improper resolution of a genuine and material issue of fact against the parties opposing motions for summary judgment. The impugned paragraph in Ganiaris' affidavit was not therefore a "naked" or "wholly unsupported allegation" as respondent has asserted to this Court (Resp. Br. p. 21).

Nor was Ganiaris' affidavit evidence "testimonially incompetent" (Resp. Br. p. 21). Ganiaris was Struthers' lead project engineer at the Maxwell House, Hoboken, New Jersey pilot plant in early 1965. For an extended period of time he worked in the company of Maxwell House engineers and had the opportunity to daily observe the perceptions and appreciation of the wax problem which he discussed in his affidavit.

Clearly, the district court overstated the case in telling of its attempt to make "every effort . . . at this time to comb the record and to determine if such [genuine] issues [of material fact] do, in fact, exist."(A-49). On the contrary, the district court stopped one exhibit short of the Ganiaris memorandum in its combing operation. As respondent surely knows, it is demonstrably not the fact that "Judge Debevoise consequently had no

occasion to consider those items [the Bosses affidavit exhibits] in connection with the motions: . . ."

THE DISTRICT COURT SHOULD NOT HAVE DECIDED THE LEVEL OF SKILL IN THE ART IN THE ABSENCE OF EXPERT TESTIMONY

The district court deduced from the alleged ease with which the problem of the gummy, waxy material clogging the centrifuge was supposedly solved in May 1964, in Winter Haven, Florida that it could it dispense with the need to determine the level of skill in the art on the basis of expert testimony and hold the patents invalid for obviousness under 35 USC § 103. Thus, the district court stated:

> "I have concluded, however, that the entire subject matter of the Reimus patents involves very simple (and I later find obvious) concepts. The skill in the applicable art is very high. (Note how easily the persons working on the "FreCon" unit in May, 1964, were able to solve the problem of gummy, waxy material clogging the centrifuge during the freeze concentration process.)" (A-407-8)

Thus the courts below concluded that a solution to the wax problem was simply and obviously arrived at at an early date and that the Reimus patents were invalid by virtue of a prior offer for sale and obviousness to a person of ordinary skill in the art. The entire subject matter of the Reimus patents *appeared simple and obvious to the court.* But such is not "the appropriate measure" under 35 U.S.C. § 103. *Chore-Time Equipment, Inc. v. Cumberland Corporation* 713 F2d 774, 779 (Fed. Cir. 1983). The problem was not that easily resolved as clearly indicated by the stated conclusion of Ganiaris' February 15, 1965 memorandum that "[t]his *problem* [wax in the extract] did not receive the proper attention from either organization, MH or SSI" (A-675).

The ten patents here in suit deal with freeze concentration of comestible liquids through the application of principles of

ice crystallization and the employment of heat exchange apparatus. It may well be appropriate for a trial court to decide that expert testimony is unnecessary in a patent case involving stackable trays[4], a feeder pan assembly for automated poultry feeding[5] or a one-piece plastic towel rack[6], but it was not appropriate in this case, particularly where documentary evidence of record, to which the courts below failed to advert, specifically indicates that the patented solutions were not obvious either to ordinary laymen or to highly skilled process engineers.

In failing to look to an available evidential source in determining the existence of genuine issues of material fact, the Court of Appeals ignored its own precedent and egregiously exceeded the established limits of summary judgment procedure. Such result warrants the consideration of this Court. As the Court of Appeals said in *Tomalewski v. State Farm Life Insurance Company* 494 F.2d 882, 884 (3rd Cir. 1974):

> "[Summary Judgment] is never warranted except on a clear showing that no genuine issue as to any material fact remains for trial * * * In reaching its determination the court has the power to penetrate the allegations of fact in the pleadings and look at any evidential source to determine whether there is an issue of fact to be tried. * * * Summary judgment may not be granted where there is the slightest doubt as to the facts. Brady v. Hearst Corp. 281 F. Supp. 637, 642 (D. Mass. 1968)."

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4 *Medical Laboratory Automation Inc. v. Labcon, Inc.* 670 F2d 671 (7th Cir. 1971)

5 *Chore-Time Equipment, Inc. v. Cumberland Corporation* 713 F2d 774 (Fed. Cir. 1983)

6 *Monoplastics, Inc. v. Caldor, Inc.* 371 F2d (2d Cir. 1967).

THE "ON SALE" ISSUE
MERITS REVIEW BY THIS COURT

Petitioners have contended (Pet. Br., pp. 15-18) that the courts below, in holding patent Nos. 3, 404,007 and 3,495,522 to Muller invalid on the grounds that the subject matter of such patents were "on sale" under 35 U.S.C. § 102(b), committed unprecedented error. The Muller patents are directed to a process and an apparatus for freeze concentrating as well as freeze drying comestible liquids. The holding of invalidity below was based on the demonstration by petitioners of its mobile FreCon *freeze concentration* unit, in Winter Haven, Florida in May 1964. This mobile unit was not capable of performing the *freeze drying* step which, along with the freeze concentration step, is an essential element of the claims of the '007 and '522 patents.

Petitioners' argument is simply this: The patent claims must describe the device or invention offered for sale in order for the "on sale" bar to apply. *Red Cross Mfg. Corp. v. Toro Sales Co.* 525 F2d 1135, 1142 (7th Cir. 1975). Since the claims of the Muller '007 and '522 patents are not directed to the FreCon unit, the "on sale" bar of section 102(b) cannot apply. In the Petition herein, *DeLong Corp. v. Raymond International, Inc.* 622 F2d 1135 (3rd Cir. 1980) and *Red Cross Mfg.* were principally cited in support of the foregoing argument. (Pet. p. 16.)

In the midst of advising this Court that the Petition "is notably bereft of citation of decisional authority supporting Struthers' opportunistic but meritless argument," respondent announces that it has found a case "directly in point," to wit, *DeLong Corporation v. Raymond International, Inc., supra* (Resp. Br. p. 18). Respondent states that in the *DeLong* case, *supra*, "[t]he patentee had made a prior sale of some, but not all, of the elements comprising the patented combination". Respondent's characterization of the *DeLong* case is profoundly incorrect.

The two patents in the *DeLong* case have to do with mechanisms for erecting massive marine platforms to be used in offshore drilling. The patent owner, DeLong, in resisting defendant's claim that the patented mechanism had been "on sale" and therefore invalid under section 102(b) argued that "the patent claim describes 'a combination of parts or components which includes an annular channel structure and an annular gripper assembly ' " and that the device that had been sold did not include an annular channel structure or an annular gripper assembly. The Court rejected DeLong's argument because the patent claim in issue was a Jepson claim.[7] The Jepson claim consists of a preamble portion which recites what is known and old in the art and an improvement portion which defines the boundaries of the claimed patent monopoly. By using the "Jepson" form the applicant for patent is relying on the subject matter following "improvement" for novelty. *Application of Simmons* 312 F2d 821, 824 (CCPA 1963). The annular channel structure and annular gripper assembly were recited in the preamble portion and not in the improvement portion and therefore were not part of the patent claim. What was sold, therefore, was precisely that which was *claimed* as the invention and covered by the patent. As the *DeLong* Court stated (p. 1143):

> The invoice identifies precisely what appears to be covered by the patentable claims of the Slemmons patent.

The Muller patent claims here in suit, unlike the patent claims in *DeLong, supra,* do not precisely, or even substantially cover the FreCon unit. *Red Cross Manufacturing Corp. v. Toro Sales Co.* 525 F2d 1135 (7th Cir. 1975).

The error of law below in this matter could well have a significant adverse effect on future patent litigation and deserves the attention of this Court.

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[7] Ex parte Jepson 1917 C.D. 62, 243, O.G. 525.

CONCLUSION

The instant petition for a writ of certiorari should be granted.

Respectfully submitted,

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